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# LIVES
## OF
# GAME ANIMALS

*Volume I — Part II*

*Order Carnivora or Flesh-eaters*

## CATS, WOLVES AND FOXES

# LIVES

## OF

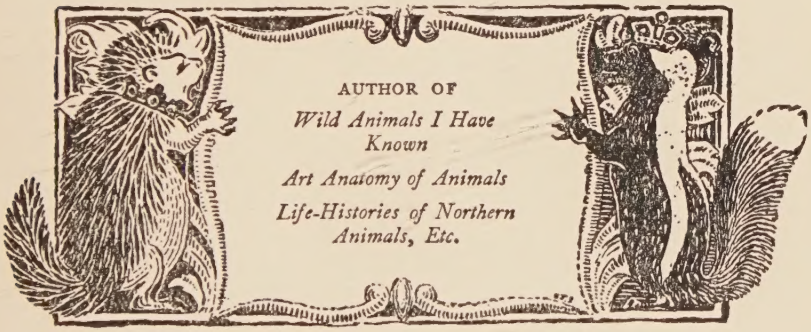
# GAME ANIMALS

*An Account of those Land Animals in America, north of the Mexican Border, which are considered "Game," either because they have held the Attention of Sportsmen, or received the Protection of Law.*


BY

ERNEST THOMPSON SETON

FELLOW NEW YORK ZOOLOGICAL SOCIETY
MEMBER NAT. INST. ARTS AND LETTERS


WITH 50 MAPS AND 1500 ILLUSTRATIONS
BY THE AUTHOR

VOLUME I — PART II
CATS, WOLVES, AND FOXES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# LIVES
## OF
# GAME ANIMALS

*Volume I — Part II*

## LIFE VIII—THE ARCTIC WOLF


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## The White or Arctic Wolf

*Canis mexicanus tundrarum* Miller

(L. *Canis*, a Dog; *mexicanus*, of Mexico; *tundrarum*, of the tundras or treeless Arctic Plains.)

*Canis tundrarum* Miller. 1912, Smiths. Misc. Coll., Vol. LIX, No. 15, p. 1.

Type Locality—Point Barrow, Alaska.

Eskimo, *Ki-gi-lún-uk* (Nelson).

The Wolves in general have similar habits and dispositions, but certain variations of behaviour, etc., are imposed probably by totally different surroundings, and are especially marked in the White Wolf of the North, for which reason I treat it in a separate chapter.

Originally it was described in 1823 as *Canis lupus-albus* Sabine. Type locality, Fort Enterprise, Mackenzie, Canada. But this name was preoccupied by the name *Canis lupus albus* Kerr, 1791, applied to the Siberian Wolf. Therefore in 1912, Miller proposed the name *tundrarum* (of the Barrens), and named, as the type, a specimen from Point Barrow, Alaska.

*Size.* A ♂, which I collected at Aylmer Lake, August 21, 1907, was: Total length, 5 ft. 6½ in. (1688 mm.); tail, 18½ in. (470 mm.); hind-foot, 11¾ in. (298 mm.); height at shoulders, 28 in. (712 mm.).

*Weight* after being bled, 88 lbs., in poor condition; was doubtless 90 lbs. alive, and when fat, 100 lbs. Capt. Geo. F. Lyons says of a very large ♂: It was "so miserably thin as to weigh only 68 lbs."[1]

*Colour.* Creamy white in general, deeper on the back, head, and ears; sprinkled with darker hairs on the back and tail, showing faintly the regular Wolf pattern; muzzle brown.

This may be accepted as a type, but the variations are numerous, some pure unsullied white, a few dusky or nearly black. The skull characters, that is, the narrow rostrum and palate, are perhaps safer as diagnostic features than either colour or size.

### Range

The map (p. 256) shows that the White Wolf is found throughout the Barrens of the North; that is, the treeless region from Bering Strait to the Atlantic Ocean; is distributed over all the Polar islands and is found sparsely

[1] Priv. Journ., p. 90.

on the narrow rim of Greenland from lat. 70° N. E. to lat. 80° at least, and round to lat. 70° on the east shore. For Rasmussen found it on the north shore of Greenland, and it is sure to go as far as the Musk-oxen and Caribou are found.

One by one the Polar islands have been added to its known domain: Baffin Land (Fisher, *Voy. Disc. to Arctic Regions*, 1821, p. 268); Melville Island (As above, p. 145); Boothia (J. C. Ross, App. Ross' *Second Voy.*, 1835, p. X); Prince of Wales Island (Kennedy *Narr. 2d Voy., Prince Albert*, 1853, p. 139); King William Land (McClintock, *Voy. Fox*, 1860, p. 309); Victoria Land (Collinson, *Journal Enterprise*, 1889, p. 244); Cornwallis Island (McDougall, *Voy. Resolute*, 1857, p. 402); Banks Land (Armstrong, *Narr. Disc. N. W. Pass.*, 1857, p. 480); Princess Royal Island (As above, p. 300); Prince Albert Land (Collinson, p. 176); Axel Heiberg Island (Sverdrup, *New Land*, 1904, II, p. 216); Ellef Ringnes Island (As above, p. 297).

In Grant Land, which is the northern part of Ellesmere Land, A. W. Greely found the Wolf occasional.[2] He killed one at Fort Conger and saw several others.

In King Oscar Land and adjoining islands, that is the western part of Ellesmere Land, "the most noxious animal of these regions is the Wolf."[3]

In Greenland, the Wolf is considered rare;[4] indeed, Egede says he met no Wolves on the western side of Greenland.[5] Referring to the south and west, Greely says: "The Wolf has never been known in Greenland, except in two cases."[6] In North Greenland, however, Rasmussen "often saw the White Polar Wolf slinking about at a safe distance like an uncomfortable reminder."[7]

Its general distribution in the Mackenzie region is given by E. A. Preble.[8]

## Haunts

Since the White Wolf is the proper parasite of the Muskox and Barren-ground Caribou, its chosen haunts are the open treeless prairies on which these animals find their homes. It may venture into the woods a little way, as do these two horned beasts, or on to the ice of the Polar Sea, but not far, and not to stay. Its ideal home is the rugged prairie country between

[2] Rep. Exped. Lady Franklin Bay, II, 1888, p. 3.

[3] E. Bay in Otto Sverdrup's "New Land," 1904, II, p. 479.

[4] Wright: Greenland Ice Fields, 1896, p. 216.

[5] Disc. of Greenland, 1745, p. 74.

[6] 3 Years, II, p. 368.

[7] Greenland by the Polar Sea, 1921, p. 299.

[8] Atha. Mack. Reg., pp. 213–14.

the north limit of the trees and the Polar Sea. Here it is found in the largest numbers, while on the Polar islands it is a rare straggler.

### Home Range

While there are no definite data on the home range, we have the side light of other Wolves. When the young are small, it is probable that the pair never go beyond a 10-mile radius from the home den.

In winter, when footloose and hunger-driven, they will travel a hundred miles or more for a meal, and drift about in the wake of herds of Muskox or Caribou, all winter long in hopes of getting a youngster or a cripple.

### Mating and Den

There is good reason to believe that the White Wolf pairs, and the marriage is for life as in other Wolves. The bond may be weak or nearly inoperative during winter, but it is there, and dominates their lives for half the year at least.

On Aug. 24, 1907, I examined a fine Wolf den on Aylmer Lake, N. W. T. It was a low natural cave under a huge rock near the lake shore. The actual bed was not more than 10 or 12 feet in, but well screened from the weather. It had no lining, but all about were quantities of Caribou bones. One skull was that of a buck that had recently lost his antlers. (See photo.) Of course, the den was not then in use, as the young were grown and running with their parents.

### Young

There is no reason to believe the young any different in number from those of the Gray-wolf. Their upbringing is probably the same, and the father is second only to the mother in his care for them, so far as known.

A few records are at hand that give a picture of Wolf family life among these white ones.

Thomas Simpson, while exploring the Arctic coast east of the Coppermine, on July 25, 1838, encountered Wolves at the mouth of a small stream near Hepburn Island, and thus refers to the incident: "The banks of this river seemed quite a nest of Wolves; and we pursued two females, followed by half a score of well-grown young. The mothers scampered up the highest rocks where they called loudly to their offspring; and the latter, unable to save themselves by flight, baffled our search by hiding themselves among the willows which fringe the stream. The leader of the whole gang—a huge, ferocious old fellow—stood his ground, and was shot by McKay."[9]

[9] Disc. N. Coast of Amer., 1843, pp. 275–76.

While ascending the lower part of Kendall River, a tributary of the Coppermine, on July 30, 1902, Hanbury saw 2 young Wolves "nearly as large as their parents."[10]

J. W. Tyrrell, who met them near the northmost extremity of Dubawnt Lake, on August 12, 1893, writes:

"At nightfall, after a long day's struggle with the opposing elements, as we were hauling the canoes ashore toward the shelter of some rocky cliffs, we were suddenly set upon by a pack of huge gray Wolves. A great, gaunt, hungry-looking brute with dilated eyeballs led the attack. He was the largest Wolf in the pack and a daring brute, but for once, at least, he met with a surprise, as he was promptly bored from end to end with a slug from my brother's rifle. The leader of the pack having been thus treated, the others fled, but revenged themselves by howling at us all night long from the surrounding hills.

"With the pack several little Wolves had been noticed, and when the old ones beat their retreat an effort was made to capture some of them, but unsuccessfully, for just as young partridges suddenly and mysteriously disappear in the leafy woods when danger threatens, so did these young Wolves disappear among the rocks, and though we searched carefully and must have been within a few yards of them, we could not get sight of one."[11]

Dr. R. M. Anderson wrote me from Ottawa on Nov. 16, 1923: "Once at Langton Bay, Oct. 14, 1910, while hunting with some Eskimos, we saw a Wolf on a ridge about half a mile away, howling. Soon 4 more appeared, passing along a low valley to join her. We stalked them and killed 3, all young of the year. The old one was probably the mother of the others. I do not think that the old Wolf saw us at first, but probably had our scent."

### Strength and Speed

In the Gray-wolf chapter, the gifts of the Wolf are fully commented on; but these additional illustrations of strength and speed noted in the White Wolf country are worth including.

"When the alarm was given," says Captain Lyon, relating an attack of Wolves on the sled Dogs, "and the Wolves were fired at, one of them was observed carrying a dead Dog in his mouth, clear of the ground, at a canter, notwithstanding the animal was of his own weight."[12]

Sled Dogs are a favourite prey with the Wolves. Captain Lyon writes further of the White Wolves on the Melville Peninsula:

[10] Northland of Canada, 1904, p. 209.

[11] Sub-Arctics, p. 98.

[12] Priv. Journ., p. 95.

"A fine Dog was lost in the afternoon. The animal had strayed to the hummocks ahead of us without its master, and Mr. [Alex.] Elder, who was near to the spot, saw 5 Wolves rush out, attack, and devour it in an incredibly short space of time; before he could reach the place, the carcass was torn in pieces, and he found only the lower part of one leg. The boldness of the Wolves was altogether astonishing, as they were almost constantly seen from the ships during the daytime prowling amongst the hummocks, or lying quietly at no great distance in wait for Dogs."[13]

Again he says (p. 95): "The Wolves had now grown so bold as to come alongside, and on this night they broke into a snowhouse in which a couple of newly purchased Eskimo Dogs were confined, and carried them off."

Richardson records that "the Wolves destroy many Foxes, which they easily run down if they perceive them on a plain at any distance from their hiding places. In January, 1827, a Wolf was seen to catch an Arctic Fox within sight of Fort Franklin, and although immediately pursued by hunters on snowshoes, it bore off its prey in its mouth without any apparent diminution of its speed."[14]

While the Wolf can catch the White Fox in deep snow, I doubt much its ability to overtake it on the level bare ground. Foxes are usually swifter than Wolves, else they would not long survive.

### Cunning

The Caribou is the favourite food, but so swift that it could always and easily escape, but for one or two stratagems that are put in practice by the Wolf.

The first is the drive and ambush, well known among the Gray-wolves of the timber country. A case is thus described by Captain Back, when on the south end of Clinton-Colden Lake on August 24, 1833. "Close by," he says, "a Reindeer appeared, running at full speed, chased by a long White Wolf, which, though it seemed to have little chance in swiftness, was nevertheless resolute in the pursuit. The Deer gradually made for a pass below the rapid, at the other side of which another Wolf was now first perceived, crouching down, with his eyes fixed on the chase, and evidently ready to spring upon the poor animal if it unhappily took the water.

"I have a strong antipathy to Wolves, however speciously attired; and though these fair-robed gentlemen were but following a natural instinct of appetite, I thought fit to interfere with voice and gesture. The panting Deer bounded past me, as if conscious of safety and protection, for the Wolf

[13] Priv. Journ., pp. 109–10.

[14] F. B. A., I, p. 63.

PLATE LXIII. THE WINNIPEG WOLF, MARCH, 1882

stood motionless for a moment, and then, scenting an enemy, slunk slowly away, under the shelter of some fragments of rocks."[15]

The pertinacity of these grim hunters in sticking to the one picked out for prey is vividly set forth in this picture-paragraph by Pike:

"It is rarely that a Caribou once singled out can escape. The Wolves hunt in bands and seldom leave the track they have selected; the chase lasts for many hours, till the victim, wearied by the incessant running, leaves the band, and his fate is sealed; he has a little the best of the pace at first but not the staying power, and is soon pulled to the ground."[16]

The Arctic Wolf is extremely cunning, and in attacking Deer or Caribou, animals which far exceed it in speed, it has recourse at times to an ingenious stratagem. The members of a pack arrange themselves in the form of a semicircle, and thus advance upon their prey, so as either to hem it in or drive it over a precipice. Sir John Franklin often found Caribou which had been thus dashed down steep cliffs and devoured, and he enlarges on the ruse as follows: "Whilst the Deer are quietly grazing, the Wolves assemble in great numbers, and, forming a crescent, creep slowly toward the herd, so as not to alarm them much at first; but when they perceive that they have fairly hemmed in the unsuspecting creatures, and cut off their retreat across the plain, they move more quickly, and with hideous yells terrify their prey, and urge them to flight by the only open way, which is that towards the precipice, appearing to know that when the herd is once at full speed, it is easily driven over the cliff, the rearmost urging on those that are before. The Wolves then descend at their leisure, and feast on the mangled carcasses."[17]

To this he adds on pp. 344–45, that on one occasion a troop of Wolves endeavoured to put the same stratagem into practice against Doctor Richardson. Having the first watch, he "had gone to the summit of a hill, and remained seated, contemplating the river that washed the precipice under his feet, long after dusk had hid distant objects from his view. His thoughts were perhaps far distant from the surrounding objects, when he was roused by an indistinct noise behind him; and on looking round, perceived that 9 White Wolves had ranged themselves in form of a crescent, and were advancing apparently with the intention of driving him into the river. On his rising up, they halted; and when he advanced, they made way for his passage down to the tents."

In my own Arctic journey, I had the chance to make several observations bearing on this trick of driving over a precipice.

[15] Back's Journal, 1836, 1892, pp. 128–29.

[16] Barren Ground of Northern Canada, 1892, pp. 52–53.

[17] Narrative Journey to Polar Sea, 1823, p. 100.

A great many of the single Caribou I saw were on the small islands. In 6 cases that came under close observation, the animals in question had a broken leg. A broken leg generally evidences recent inroads by hunters, but the nearest Indians were 200 miles to the south, and the nearest Eskimos 300 miles to the north. There was every reason to believe that we were the only human beings in that vast region, and certainly we had broken no legs. Every Caribou fired at (8) had been secured and used. There is only one dangerous large enemy common in this country, that is, the White Wolf. And the more I pondered it, the more it seemed sure that the Wolves had broken the Caribous' legs.

How? This is the history of each case: the Caribou is so much swifter than the Wolves that the latter have no chance in open chase; they therefore adopt the stratagem of a sneaking surround and a drive over the rocks or a precipice, where the Caribou, if not actually killed, is more or less disabled. In some cases only a leg is broken, and then the Caribou knows his only chance is to reach the water. Here his wonderful powers of swimming make him easily safe, so much so that the Wolves do not attempt to follow. The crippled Deer makes for some island sanctuary where he rests in peace till his leg is healed, or it may be, in some cases, till the freezing of the lake brings him again into the power of his foe.

These 6, then, were the cripples in hospital, and I hope our respectful behaviour did not inspire them with a dangerously false notion of humanity.[18]

### Valour

The following from Captain Lyon's "Journal" shows that some White Wolves, at least, are full of fighting valour.

"In the evening a Wolf was taken in a trap set by the *Fury*, and three balls were fired through him while imprisoned. His hind-legs were then tied, and he was dragged out, tail foremost, by a rope; this he instantly bit through with ease, springing at Mr. Richards, who was the nearest to him, and seizing him by the knee; being thrown off, the animal flew at his arm, but, with great presence of mind, Mr. Richards grasped his throat and flung him back, at the same time retreating a pace or two, when the Wolf quickly made his escape, having done no other damage than tearing Mr. Richards's clothes, and slightly wounding his arm. It was very fortunate that the requisite quantity of winter clothing formed a good defence, and that the person attacked was a powerful young man, the effects might otherwise have been more serious. Mr. Nias struck the animal once or twice with a cutlass, but without doing it any injury.

[18] The Arctic Prairies, E. T. S., 1911, pp. 225–26.

"On the morning of the 8th, the same Wolf was found round the S. E. point, frozen quite stiff. A raven discovered the position of the carcass by hovering over it after having picked out one of the eyes."[19]

### Hydrophobia

Many travellers in the Far North have testified to the epidemics of hydrophobia that break out at times to thin the ranks of the Wolves. We have already noted the various records made by Alex. Henry in the article on Gray-wolf. A more complete account is given by my old friend, Buffalo Jones, who visited the Land of the Wolf in 1897. His Dogs had numerous encounters with the Wolves, and in his record is the following:

"Shortly after reaching our cabin we noticed that one of our large Dogs ('General'), next to the lead in the team, grew very quarrelsome and was continually fighting his comrades. He was quite old, and his tusks were worn off until very blunt. We had observed his strange actions while on the last of our homeward trail, but knowing he could do little harm we paid but little attention to them. He had always been peaceable, and we trusted him more than we ought; at least Mr. Rea did. I was convinced from his strange actions and the froth from his mouth that he had a genuine attack of hydrophobia. He would bite his tongue until the blood and foam would run out of his mouth in a stream, and was continually snapping at everything that came near him. When we tied him up he would howl so pitifully we could not sleep. Several times Mr. Rea got up in the night and let him loose. During the day while hauling wood, he would pull all the load himself, trying to get to the Dog ahead to fight him. It made no difference how many joined against him, the more there were the better he liked it. His teeth being so dull was all that allowed a single one to escape. He was very vicious when once aroused to anger, and had been the most faithful of our train Dogs in guarding off the Wolves.

. . . . . .

"Finally he attacked Mr. Rea, and but for his thick buckskin mittens and the blunt teeth of the Dog, he would have been inoculated with the poisonous virus. Mr. Rea grabbed his gun, and instantly put an end to old 'General's' sufferings.

"We were convinced that he had a well-developed case of hydrophobia; that he had been inoculated by the bite of the Wolf which came so near to me that night at the tent while I was out on the Muskox hunt. The Wolf, doubtless, was passing through the last stage of the dreadful scourge itself.

[19] Priv. Journ., p. 96.

I firmly believe that it is that disease which keeps the Wolves of the Barren Lands reduced in number, or they would increase so rapidly as to exterminate all ruminant animals, for they propagate fully 5 to 6 times faster than either the Caribou or Muskox; besides, they have no enemies to lessen their number, for the Indians will never kill a Wolf except in self-defence, believing that after death, one who kills a Wolf will be transmuted to that animal in the Happy Hunting Grounds."[20]

### Starvation

While rabies may break out at times to thin the ranks of the White Wolf, there is no doubt that starvation is the principal and dreaded foe. Nothing but starvation would gather the Wolves together and keep them persistently hanging about what they must soon realize is speedy death, as in this chapter from the travels of Buffalo Jones.

He and his partner Rea had killed some Muskox far out on the Barrens. "That night it appeared as if all the Wolves in North America had congregated around our teepee to take vengeance on us for slaughtering these dumb brutes. At early dawn I peeped out. Every elevation, every depression, and every slope between, was literally covered with Wolves. Some stood within 4 rods of the teepee. I slipped my Winchester through the door, and selecting a large, pure-white animal, held my gun rather low, as it was quite dark, and I feared I might overshoot the mark. At the crack of the gun, the Wolf went hobbling off, but soon fell dead, as I supposed. I lingered a moment, hoping to get another shot, but the others took the hint and skulked away.

"I then went out to examine the one I thought already killed, but the moment I came near it, up it jumped and started to run. I gave him another shot and he came down. When I approached him I found both a fore and hind-leg broken; I shot him again, and he soon expired. He was a magnificent specimen, so I set myself to work to skin him for mounting.

"After I had proceeded well with the work, I was astonished to discover that the brute had eaten off his foot below the place where his leg had been broken by my first shot. No doubt, on smelling the blood that saturated his leg, his appetite could not be restrained. The foot gone, I regarded the animal as worthless for the purpose desired, so abandoned it. I had often seen Wolves, when wounded, devoured by others of a hungry pack, but this was the first time I had ever witnessed or heard of any animal eating itself. (I have inserted this remarkable instance, despite the protest of Mr. Rea, for while he declares that he personally knows it to be true, yet says no

[20] 40 Years, pp. 397–99.

one will believe it. I am determined to give facts, regardless of the opinions of the public.)

"We were astonished, when we inspected the 6 Muskox carcasses, to find that they had not been disturbed in the least by the numerous hungry Wolves."[21]

In corroboration of this story, I myself camped on Buffalo Jones's trail in 1907, and spent some days in the shanty which he built and left with his initials carved on the fireplace. He had related how the Wolves hung around near the door and could almost be clubbed. Within 20 or 30 yards of the door, I found the crumbling skulls of a dozen, and fragments of the skeletons near by showed that this was where they fell, and unquestionably they were slain by Buffalo Jones or his partner, for no other white men had wintered there since.

Another and more thrilling account of Wolves besieging Buffalo Jones's camp on the Barrens is given in the chapter on "Captivity of the Young Muskox."

The fact that Wolves are constantly weeded out by hunger is shown in the following record by Richardson:

"In the spring of 1826 a large gray Wolf was driven by hunger to prowl amongst the Indian huts which were erected in the immediate vicinity of Fort Franklin, but not being successful in picking up aught to eat, it was found a few days afterward lying dead on the snow near the Fort. Its extreme emaciation and the emptiness of its intestines showed clearly that it had died from inanition."[22]

My own experiences with the White Wolf have been but few. The most interesting was as follows:

In Aug., 1907, I was camped at the extreme north end of Aylmer Lake. My canoeman, Billy Loutit, had once or twice seen a Wolf hanging about the neighbourhood of the camp. On the morning of August 21st, there was a heavy storm of rain and sleet, so we did not rise till near 9 o'clock. Then Billy, "starved out" of his tent, got up; speedily he sang out: "Mr. Seton, here's a big Wolf out here, right by the fire."

"Bring him in here," I said, sleepily and half incredulously.

"Bang" went a gun; my tent door was opened and Billy flung on my bed the Wolf that is described in the first part of this chapter. The skin is now in the American Museum.

Dr. R. M. Anderson writes me: "I had more or less experience with *Canis tundrarum* for several years, and was beginning to be skeptical of the

[21] 40 Years, pp. 373–74.

[22] F. B. A., I, p. 64.

Mackenzie stories of Wolves coming into camp, when, toward the end of my sixth winter in the Arctic, on Feb. 10, 1915, a large white female Wolf came boldly into camp among our Dogs at breakfast time. One of the men went out and saw the Wolf walking among the Dogs. The Dogs growled a little, but made no attempt to touch the Wolf. The Wolf came toward Mr. Johansen, who was unarmed, but he shooed it away. Mr. Jenness then came out of the tent and hurled a rock at the Wolf, which promptly left the Dogs and attacked him, sinking her teeth in his left forearm. By that time, I got my rifle free from the lashings on top of the toboggan, but as Jenness was pretty well tangled up with the Wolf, it was some time before I could put a bullet through the Wolf without hitting Jenness. It was a regular comedy of surprises, as when the first man went out and called 'Wolf!' everybody thought the Wolf would be a quarter of a mile away and making for shelter before anybody could get outside. This was a little below Bloody Fall on the Coppermine River, where we were camped at the foot of a boulder bank.

"Thirteen days later, Feb. 23, at mouth of Tepee Creek, a little below mouth of Kendall River, another Wolf came up among the Dogs, which were grouped around the pot where dog-food was being cooked over an open fire. My companion was tending to the fire while I was some distance away cutting logs to make a cache. The Dogs began to snap and snarl a little, but made no concerted action. Mr. Castel called to me and I got the Mannlicher down from a tree branch near the tent, but could not shoot for some time, as a Dog would be first on one side and then the other side of the Wolf, so that I could not shoot the Wolf without hitting a Dog. Finally, at a distance of 12 to 15 feet, I shot the Wolf which had acted much like the Wolf at the Bloody Fall camp. This Wolf was also a female, more yellowish than the other one, with a blackish streak along the back. The flesh was in good condition, and was mostly eaten by the Dogs during the night, although they merely sniffed at it when the flesh was warm.

"These were two instances of unusual behaviour in one month, and never noted by me before or since. Presumably these individuals were female Wolves in heat."

### His Primitive Simplicity

From the foregoing incidents, it will be seen that the fear of man is fallen on the White Wolf except when desperate with hunger. Captain Lyon says: "From all we observed, I have no reason to suppose that they would attack a single unarmed man, both English and Eskimos frequently passing them without even a stick in their hands; the animals, however, exhibited no symptoms of fear, but rather a kind of tacit agreement not to be

the beginners of a quarrel; even though they might have been certain of proving victorious.[23]

This attitude of respect for man, without the terror that comes from realizing his destructive power, seems to show the primitive mind of the Wolf. It is the explanation of the ease with which they are trapped in the Far North.

The White Wolf has not been specialized by long pursuit of hunter and trapper, as has the Wolf of farther south. While it shows a respect for man—at least an unwillingness to cope with him at close quarters—its fear is not so highly developed as is that of the Gray-wolf, and its dread of a trap has not yet begun, or it could not be taken in the simple device used by the northern tribes and thus described by Captain Lyon:

The Eskimo Fox and Wolf trap "is made of strong slabs of ice, long and narrow, so that a Fox can with difficulty turn himself in it, but a Wolf must actually remain in the position in which he is taken. The door is a heavy portcullis of ice, sliding in two well-secured grooves of the same substance, and is kept up by a line, which, passing over the top of the trap, is carried through a hole at the furthest extremity; to the end of the line is fastened a small hoop of whalebone, and to this any kind of flesh-bait is attached. From the slab which terminates the trap, a projection of ice, or a peg of wood or bone, points inwards near the bottom, and under this the hoop is lightly hooked; the slightest pull at the bait liberates it, and the door falls in an instant. Foxes are sometimes taken out by hand, but a Wolf is speared as he lies confined."[24]

The following also by Captain Lyon shows that in spite of their hard and perilous lives, these Wolves do sometimes attain a green old age. "On the night of the 24th, one of these voracious creatures was shot from the ship by our indefatigable sportsman, George Dunn; it was beautifully white, a male, and of a large size; he was very old; for all the teeth, and even the tusks, were worn down to the gums."[25]

As one ponders on the lives and changing habits of the creatures that have had most contact and bitterest experience with man, the thought recurs again and again: What were these wild things like, before they met with the ever-hostile, hateful humankind? One longs for a glimpse of those far-off happy days when our Little Brothers were not afraid to be seen, and lived not ever in the withering circle of a pitiless gunfire that ceased only at dark.

[23] Priv. Journ., p. 110.

[24] As above, p. 246.

[25] As above, p. 215.

Just such a glimpse is offered by the present animal. In all respects a Wolf, the same in make-up, mind, and needs as his furtive, fearsome cousin in the woods, he gives us in his life an exact picture of what his Southern kinsman was 200 years ago. First, and in all his ways, he is simply a big wild Dog, living on flesh that he gets by open chase, recording his call on tree or corner stone, unsuspicious and friendly, wagging his tail for pleasure, or baying at the moon, more prone to attack the running than the facing foe—for all his instincts are for pursuit—unafraid of man, yet restrained by some unknown force from attacking him, very ready to become his friend, his follower, his helper, and his slave.

All this we see in the Arctic Wolf, and it used to be in the Timber-wolf, till constant warfare changed him. A truer concept will be conjured up if we call them "Arctic Dog" and "Timber Dog"; for that is all they are—big Dogs, very doggy Dogs—only a little wild.

### References for Arctic Wolf

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## Coyote, Cuiota, Kyute, Prairie-wolf, Brush-wolf, American Jackal, Cased Wolf, Little Wolf

*Canis latrans* Say

(L. *Canis*, a Dog; L. *latrans*, barking; because it is an habitual barker, more than is any other wild Dog.)

*Canis latrans* SAY, 1823. Long's Exped. Rocky Mts., I, p. 168.
TYPE LOCALITY—Council Bluffs, Ia.

FRENCH CANADIAN, *Coyote.*
CRE, *Mes-cha-cha-gan-is'.*
SAUTEAUX, *Mes-cha-chag'-an-is.*
OJIBWAY, *Mes-ta-cha'-gan-es.*
YANKTON SIOUX, *Song-tóke-cha.*
OGALLALA SIOUX, *Mee-yah-slay'-cha-lah.*
MEXICAN, *Coyóte.*

"Cased Wolf" is the old trade name of the Coyote, because its skin was cased like that of a Muskrat, while the Gray-wolf's pelt was spread out flat like that of a Beaver.

The following, from F. W. Beechey's "Narrative" (1831, p. 403), is the earliest form of the word "Coyote" that I find in English print: "Wolves and Foxes are numerous, and the *Cuiotas*, or Jackalls, range about the plains at night, and prove very destructive to the Sheep."

The generic characters are as in the Gray-wolf, but the Coyote may be distinguished from the Gray-wolf, first and chiefly, by its much smaller size, slender build, and almost fox-like muzzle and ears; second, its general warmer sienna colour. At a distance the Wolf looks like a grayish-white animal with a small tail held high; the Coyote, a pale yellowish animal with a heavy tail held low. (See Plate LXVIII.)

*Size.* A very fat ♂ killed at Touchwood Hills, Sask., by Ed. Hollis, in the winter of 1901–02, measured: Head and body, 2 feet 9½ in. (850 mm.); tail, 13 in. (330 mm.); hind-foot, 7¾ in. (196 mm.); ear, 4 5/16 in. (110 mm.).

*Weight.* During a winter's trapping near Clayton, N. M., 1893–94, I weighed a few of the many Coyotes taken, between Nov. 4 and Jan. 21, as follows: ♂ 16¾, 31½, 21½, 26½, 26, 23, 25, 31, 25½, 29, 25½, 24, 27½, 26, 28, 31,

29 lbs.; ♀ , 21 1⅛, 19¼, 21, 21½, 23, 23, 21, 27, 25½, 22 lbs.; an average of 26¼ for the ♂s and 22½ for the ♀s.

The Saskatchewan ♂ measured as above was not unusually large, but it was the heaviest Hollis ever saw, weighing 42 lbs. on standard scales.

A still heavier is reported to me by George L. Rimington, of Penrith, England. He spent the winter of 1907–08 hunting Coyotes near Calgary, Alta.; out of 85 killed, the heaviest was a very large ♂ which weighed 46 lbs. on standard scales. As the date was early November, it was of course at its fattest time.

A Winnipeg specimen (♀) collected in the October of 1908 by E. W. Darbey was: Length of snout to tail-bone tip, 4 ft. 1 in. (1245 mm.); tail, 1 ft. 2½ in. (369 mm.); hind-foot, 8 in. (203 mm.); height at shoulders, 1 ft. 9 in. (534 mm.); weight, 25 lbs.

Richardson gives 3 ft. (915 mm.) as the length of the head and body of a specimen he took on the Saskatchewan.[1] In New Mexico, among a score of Coyotes of the local form (*lestes*), I found many of the above dimensions, but the heaviest, a ♂, weighed 31½ lbs.

*Colour.* "Muzzle dull and rather pale fulvous, finely sprinkled with gray hairs (chiefly above) and with black hairs (chiefly on cheeks); top of head from front of eyes to ears grizzled gray, the pale fulvous zone of under-fur showing through, but the gray predominating; ears deep, rich fulvous, sparingly sprinkled with black hairs; upper parts from ears to tail coarsely mixed buffy-gray and black; under parts and upper lip whitish; long hairs of throat sparingly tipped with blackish, giving the broad collar a grizzled appearance; fore-legs and feet dirty whitish, becoming dull clay colour on outer side of leg; hind-legs and feet dull fulvous on outer side, white on inner side and on dorsal surface of feet, the change from fulvous to white rather abrupt; tail narrowly tipped with black, its under side whitish basally, becoming pale fulvous on distal half and tipped and edged with black."[2]

The above colour description fits, word for word and hair for hair, the typical male Gray-wolf described in the Wolf chapter (pp. 252–3). The only difference I find on comparing many skins of Gray-wolf and Coyote is in the under-fur of the back, which usually is gray-brown in the former, and sienna-brown in the latter. There are many exceptions, however, so that we must look to the size of the animal, with its cranial and dental character, for reliable diagnosis.

The Winnipeg specimen measured above agrees fairly well in colour with this description, but has the lips fulvous, a black spot on the forepart

[1] F. B. A., 1829, I, p. 74.

[2] Merriam's Revision, p. 23.

PLATE LXIV.—COYOTE

From specimen taken by E. T. Seton, Manitoba, December, 1882

of each fore-leg, and a large black spot on the base of the tail over the gland. The under-fur everywhere is plumbeous, except on the throat, where it is pure white.

In the New York Zoölogical Park was a beautiful specimen of an albino Coyote, a male, with wholly white coat. Another was reported killed by Frank Smith at Corral de Tierra, Cal., April, 1912.[3] The white freak is as rare among Coyotes as it is abundant among Squirrels and Deer.

While we speak broadly of the Coyote as though it were one species, it should be remembered that scientists recognize at least a dozen kinds that are closely akin, and yet have their own peculiarities and habitats. But they agree in their general style and character; the Coyotes everywhere are sons of the desert, Ishmaelites living by their wits. Further, they are alike in their vocal gifts—our Ishmaelite is also a Troubadour.

### Races

Sixteen forms are recognized:

*latrans* Say, the typical form. T. l., Council Bluffs, Ia. This the first of the Coyotes to be discovered was, of course, the one that is found farthest East. It happens also to be the largest.

*nebracensis* Merriam, similar but "everywhere paler; backs of ears buff instead of fulvous; skull and teeth smaller." T. l., Johnstown, Brown County, Neb.

*texensis* Bailey, like *nebracensis*, "but darker, brighter coloured, and with lighter dentition; smaller, brighter, and more fulvous than *latrans*." T. l., 45 miles southwest of Corpus Christi, Tex.

*lestes* Merriam, very similar to *latrans* in size and colour, "cranial characters as in *nebracensis*, but skull and teeth averaging somewhat larger." T. l., Toiyabe Mountains, Nye County, Nev.

*cagottis* H. Smith, like *peninsulæ*, but slightly larger and redder, with somewhat shorter ears, larger teeth, and broader rostrum. T. l., Rio Frio, between City of Mexico and Puebla, Mex.

*peninsulæ* Merriam, like *ochropus*, but darker and richer in colour; under side of tail blacker. T. l., Santa Anita, Cape St. Lucas, Lower Calif.

*microdon* Merriam, small and dark with small teeth; upper surface of hindfoot whitish. T. l., Mier, on Rio Grande, Tamaulipas, Mex.

[3] Monterey American, Cal., April 27, 1912.

*impavidus* Allen, like *cagottis*, but much larger, not unlike *mearnsi* but much paler. T. l., Rio del Bocas, Durango, Mex.

*estor* Merriam, a small and very pale form, with small teeth. T. l., Noland's Ranch, San Juan River, San Juan County, Utah.

*jamesi* Townsend, like *estor*, but richer and more buffy, with teeth almost equal to those of *lestes*. T. l., Tiburon Island, Gulf of California, Mex.

*ochropus* Eschscholtz, like *latrans*, but smaller and more highly coloured, with large ears and small teeth. T. l., California, probably Tracey, San Joaquin County.

*vigilis* Merriam, like *peninsulæ*, but darker and more highly coloured, with more black on fore-arm and no black on under side of tail except at tip; teeth small. T. l., Manzanillo, Colima, Mex.

*clepticus* Elliott, a small reddish form with short skull and weak teeth. T. l., Vallecitos, San Pedro Martir Mountains, Lower Calif.

*goldmani* Merriam, equal to *lairans* in size, but with shorter rostrum; much paler under-fur than *vigilis* or *cagottis*. T. l., San Vicente, Chiapas, Mex.

*frustror* Woodhouse, whether this is a big Coyote or a small Wolf is not certain. It is much like *peninsulæ*, but larger and paler. T. l., about 100 miles west of Fort Gibson, probably in Payne County, Okla.

*mearnsi* Merriam. This is so different in its way of life that a separate chapter is given wherein it is fully described. T. l., Quitobaquita, Pima County, Ariz.

### Range, with Map

In primitive times the Coyote was a creature of the open spaces in the great West. Its range was pretty nearly as shown on the map down to the year 1890 or 1900. The total area it originally inhabited was 3,000,000 square miles.

While most of the wild creatures of the West—nearly all of the important ones—have been reduced to ever smaller range, and are steadily dwindling in number, of the Coyote we have an entirely different story to tell. For it holds in some degree its ancient hunting grounds, and has spread as man has cleared the forests east and north; so that its range to-day is much larger than in primitive times.

The average Coyote brood is 6; that is, less than the average Gray-wolf's brood. The enemies of the Coyote are the same as those of the Gray-wolf, with winter famine as the most destructive. After getting the views of many hunters and naturalists, I am led to believe that the Coyote adds to its total number about 20 per cent. per annum, and that only while *they are well within the limit of the winter food supply*. If they have reached that limit, they do not increase at all in number, only in quality. Wherever they are being relentlessly destroyed in number, they are within the limit of the winter food, and I take 20 per cent. increase per annum as safe basic figures.

"During the past two years [1897 and 1898], the State of Wyoming paid bounty on 13, 326 Coyotes,"[5] or 6, 663 each year, without appreciably decreasing the number, on her area of 97,000 square miles, about one thirtieth of the Coyote range, which, reckoning by the rate already set forth, would yield a total population of 2,250,000 scattered over the West.

"The capture of 23,208 Coyotes is reported [in 1907] from 77 national forests, which comprise an area of 106,746 square miles. This, if doubled to include the surrounding country to which the reports also refer, makes an area of approximately 213,492 square miles; or about one ninth of that inhabited by Coyotes in the United States."[6]

Since poison is freely used, this would mean a destruction of 50,000 Coyotes, and since their numbers are slowly dwindling under the drain, that means the kill is well over 20 per cent., and indicates a total of 200,000 in the Forest region, or a round 2,000,000 Coyotes in the United States. Adding one tenth for Canada and Mexico, means, in round numbers, 2,200,000 on the whole range in 1908.

We have seen that each pair of Coyotes has a home range of 20 or 30 square miles. But this does not mean that they occupy the area to the exclusion of their kind; probably the ranges of at least half-a-dozen pairs overlap on the same hunting ground, which assumes a general population of 10 to the township. These calculations would, if correct, give us a Coyote population in Manitoba of 12,000. This, it will be seen, is too low. In 1904 the Manitoba government paid bounties on 4,541 Prairie-wolves

[5] Emerson Carney: Forest & Stream, Feb. 25, 1899, p. 145.

[6] Destruction, pp. 5–6.

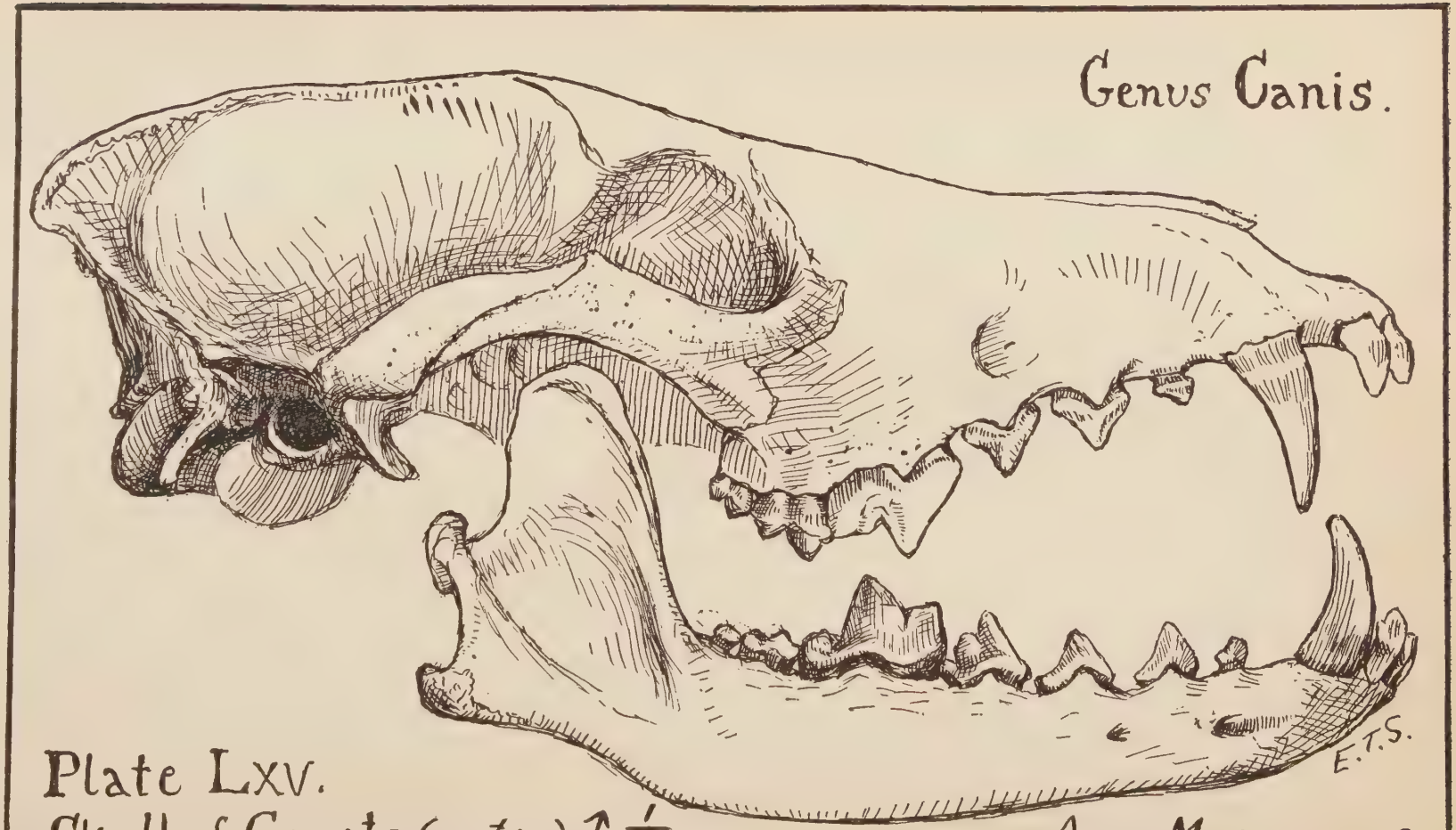


Plate LXV.
Skull of Coyote (estor) ♂ 1/1

Amer. Museum 1308

killed in the Province. The testimony of all observers is that the Wolves are increasing in spite of this destruction; therefore, the annual increase is greater than the annual kill; and the annual increase is only 20 per cent. This would presuppose an original population of at least 25,000, which we may safely accept as a minimum of Coyotes in Manitoba, and of course they are condensed in the southwestern half of the country (50,000 square miles), which gives 1 Coyote to 2 square miles, in flush time, say December.

That this is a low estimate the following shows: In *Shields' Magazine* for April, 1904, p. 215, Jack Comegys describes a recent Coyote drive at Evans, Colo.; about 20 square miles (half a township) were included, and some 40 Coyotes rounded up; that is, 80 to the township, or say 2 to the square mile.

Further, according to the United States Biological Survey,[7] the State of Kansas (81,700 square miles), in the year ending July 1, 1904, paid bounties on 20,000 Coyote scalps, but their numbers were not perceptibly diminished; at least as many—the Colorado evidence would say even double as many—were left, which would make the population about 30 to the township, or nearly 1 to the square mile. In the two provinces of Canada which fall wholly within the Coyote kingdom, Saskatchewan and Alberta, totalling 250,000 square miles, 23,944 Coyotes were killed (official records) in the season of 1921–22. This presupposes a kill of 50,000, and since the numbers stand the strain, points to a population of 250,000, or 1 to every square mile.

Yet another gauge for approximate figures, one which shows that 1 per square mile is often exceeded: In the $10\frac{1}{4}$ square miles of the Spring Valley Water County, San Francisco Peninsula, Cal., 17 Coyotes were taken in the season of 1921–22, besides many other fur-bearers, and undoubtedly some Coyotes were left, that is 1 Coyote to about half a square mile is the rate there prevailing.[8]

Thus, then, by the rate of Coyote population in Wyoming about 1898, the total of the Coyote population may be 2,250,000. By the rate in the forest area, it may be 2,000,000. By the rate in Manitoba, Saskatchewan, Alberta, Colorado, Kansas, and San Francisco Peninsula, 1 Coyote to the square mile is a safe estimate, too low for the part most densely populated, and too high for the north and wooded areas; and on the whole Coyote range will give between 2,000,000 and 3,000,000, say 2,500,000.

With these figures before me, I venture to say that the Coyote population in primitive days was at least 2,000,000. It is considerably reduced to-day, yet the diminution in the Central region is partly offset by extension into new territory.

[7] D. E. Lantz: Bull. 20, p. 9.

[8] Cal. F. & G., Oct., 1922, pp. 230–31.

### The War and the Slaughter

It would be easy to cover many pages with records of slaughter in the Coyote war. A few examples will suffice.

California in 18 months, beginning 1891, paid bounties for the killing of 37,493 Coyotes.[9]

During the 18 months ending June 30, 1894, the State of California paid a $5 bounty on Coyote scalps, with the result that 71,723 scalps were presented, and with the only visible consequence, a vast increase in the Jackrabbits and other creatures on which the Coyotes feed.[10]

Bounties were paid on 19,514 Coyotes killed in Kansas (81,700 square miles) in the year ending July 1, 1904.[11]

In 1921–22, according to the official Reports (Fur Branch, Bur. Statistics) 1,969 Coyote pelts were marketed from Manitoba, so that my 1909 estimate was far below the mark, was, in fact, about half of the output. This, I take it, represents an annual kill in Manitoba of at least 5,000 Coyotes.

The total of pelts from Canada that same year was 30,551, implying a kill of about 100,000 a year.

The Modoc County, Cal. (3,741 square miles), records show that bounties were paid on 1,337 Coyote scalps during the period from Feb. 15 to Nov. 1, 1915.[12]

In 1921, Modoc County paid bounty on almost 1,000 Coyotes, many others being killed upon which the bounty was not collected;[13] so that apparently their numbers are not perceptibly reduced.

During the 5 years, July 1, 1915, to June 30, 1920, the Biological Survey reports the killing of 109,338 Coyotes in the States west of the 100th meridian.[14] That is 20,000 a year in the 1,000,000 square miles of range concerned.

During the 9 months following July 1, 1921, the official report shows 1,008 Coyotes killed and taken in California; probably 3,000 were killed, as poison was largely used.[15]

In Wyoming (97,575 square miles), during the years 1897–98, 13,326 Coyote bounties were paid; that is, 6,663 each year.[16]

[9] T. S. Palmer: Yearbook, U. S. Dept. Agri., 1896, pp. 55–68.

[10] T. S. Palmer: Jackrabbits of U. S., 1896, U. S. Dept. Agri., p. 45.

[11] Lantz: Coyotes, p. 10.

[12] Wm. S. Brown: Cal. F. & G., April, 1916, p. 112.

[13] Cal. F. & G., July, 1922, p. 192.

[14] Yearbook, U. S. Dept. Agri., 1920, p. 299.

[15] Cal. F. & G., July, 1922, p. 186.

[16] E. Carney: Forest & Stream, Feb. 25, 1899, p. 145.

## The Triumph of the Coyote

And what is the result? In Kansas, where the greatest rate of slaughter took place, 1904, Lantz adds: "No diminution in the general numbers of the animals resulted."[17]

"Except in a few thickly settled regions, it has thrived upon civilization, and is practically as numerous as it was before settlements began. Indeed, in many parts of the West, Coyotes are said to be increasing in spite of a constant warfare against them."[18]

Not only is this so in the West, but in the North and in the East, as the following records show:

"Okanagan Landing, B. C., Nov. 1, 1908.—The Coyote ranges commonly far north of these localities [Ashcroft and Shuswap]. It is common at Quesnel and up the Fraser River as far, at any rate, as Fort George. I sent a specimen from this region to the Biological Survey collection about 8 years ago, which was identified by Doctor Merriam as *Canis lestes*.

"In the Lac la Hâche Valley, it is especially numerous, and I have heard of ranchers there that paid their taxes with Coyote scalps when the bounty was only one dollar per head.

"There are records, I believe, far north of any of these points at the more northern Hudson Bay posts. Wherever Rabbits are plentiful and the snowfall not too heavy, Coyotes are pretty sure to occur.

"It may perhaps be interesting to note that about the year 1893 Coyotes appeared in the Fraser Valley at Chilliwack, west of the Cascade range, and only 60 miles from the coast line. I saw an undoubted specimen that was killed there in 1897. Since then they have almost disappeared from that section. In no portion of the Province are they confined to the 'arid regions.' They are even found regularly in the summer and fall above timber line on the highest mountains."[19]

J. D. Figgins tells me that they are abundant now (1922) in Stickeen River Valley, mostly about Telegraph, Creek County, B. C.

Ever farther north they have pushed their way. In 1907, Madison Grant secured a complete skin and skeleton of a Coyote killed near Whitehorse on Alsek River, Alaska, in February of that year. Dr. J. A. Allen examined the specimen and found it closely related to *lestes*. The spot near the Alaskan boundary marks this record.

In the interior their progress has been nearly the same.

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[17] Coyotes, p. 9.

[18] As above, p. 8.

[19] Allan Brooks: Forest & Stream, Nov. 21, 1908, pp. 812–13.

In 1897 they were unknown at Fort McKay on the Athabaska. About 1902 they first appeared, and in 1907 were numerous.

On my northern journey I found that, though unknown in 1900, the Coyote had pushed forward to Lac la Biche and along the river valley to Fort MacMurray, where they were abundant in 1907; and still farther till they were of regular occurrence on the south shore of Great Slave Lake at the time of my visit (1907).

"In 1903," according to E. A. Preble, "Merritt Cary was informed by William McLeod that 2 Coyotes were killed near Fort Nelson, on Fort Nelson River, about the year 1898. During my stay at Fort Simpson, I received confirmatory information from several persons who had formerly resided at Fort Nelson, regarding the occurrence of the Coyote at that place.

"Tyrrell reports shooting a Coyote on a small lake near the source of Foster River, about 200 miles southeast of Athabaska Lake, in the summer of 1892."[20]

"J. Alden Loring reported this species common at Edmonton in Sept., 1894. In 1895 he found it abundant in the foothills of the Rockies in western Alberta, and shot one at Jasper House on Aug. 30. In July, 1896, he occasionally heard Coyotes in the mountains 15 miles south of Henry House, but the animal was less abundant there than in the foothills to the eastward. In the early autumn, while making a trip from Jasper House northward to Smoky River, he heard the animals nearly every night, and took a young one at Strawberry Creek, 14 miles north of Jasper House, on Aug. 23. In October of the same year, he saw Coyote tracks in Caribou Basin and Rodent Valley, and obtained skulls at Prairie Creek and Whitemud to the eastward of Jasper House."[21]

And ever northward march these clever little Wolves, till now "Stefansson says that Coyotes for the first time in history have appeared in Arctic Red River within 100 miles of the polar ocean."[22]

In Manitoba, it prefers the untimbered portions of the north temperate regions, but is far from confining itself to the open country. The woods from Pembina to Riding Mountain, as well as immediately east of Winnipeg, are now well supplied with the species. I found it abundant about Lake Winnipegosis on the east side of the water, even where fully 100 miles in direct line from open country. And northwesterly, its range extends into the forest 500 miles to Great Slave Lake. It is never found, so far as I can

[20] Ann. Rep. Can. Geol. Surv., VIII, new ser., p. 13D, 1896.

[21] Preble: N. A. F., no. 27, 1908, p. 215.

[22] Field & Stream, April, 1919, p. 928.

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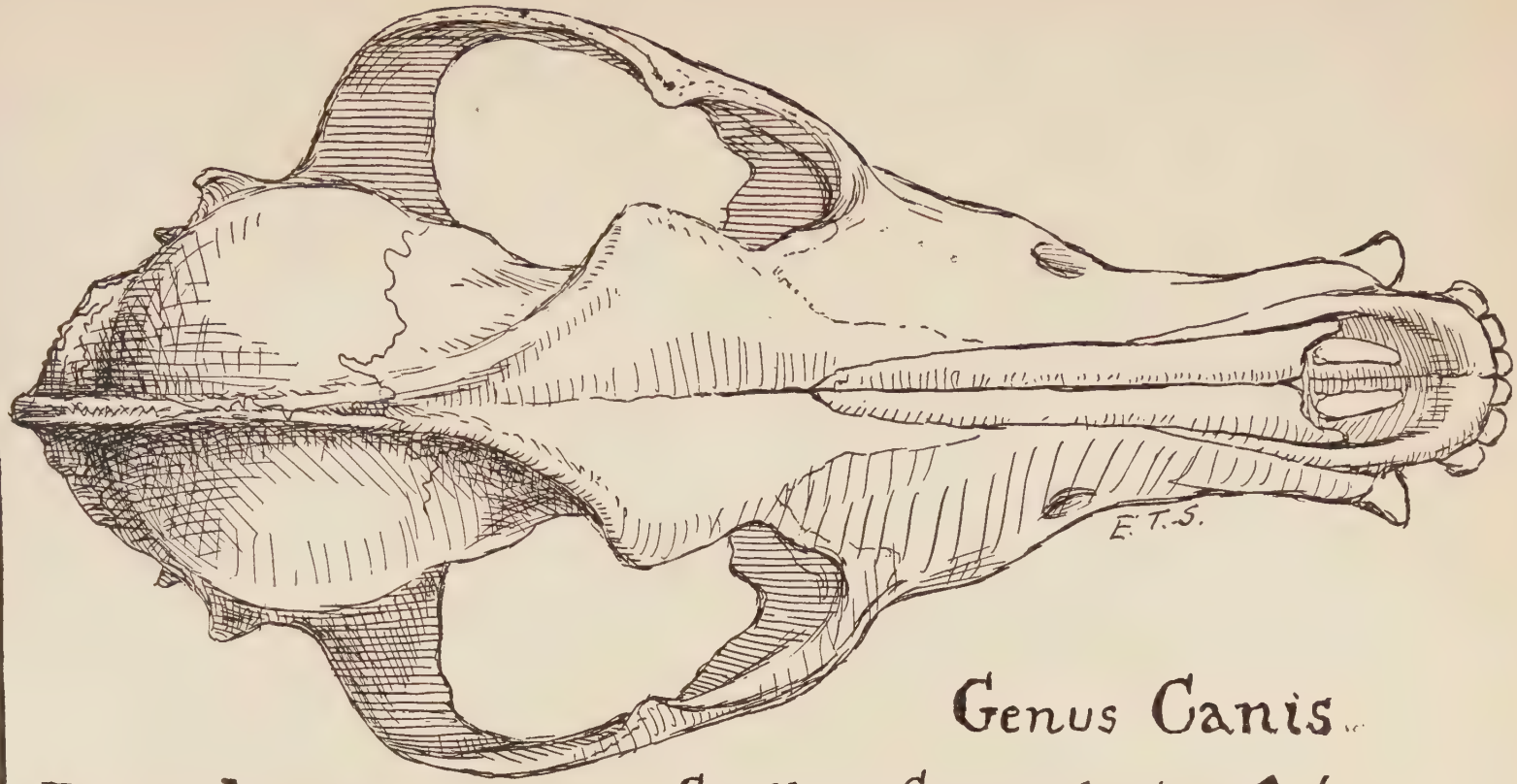



Genus Canis.

Plate LXVI. Skull of Coyote (estor) ♂ 1/1

learn, in the northeastern or coniferous region of Manitoba, but it is more or less plentiful in all the southwestern half of the Province.

In Minnesota, where once it was confined to the prairies, it has worked easterly and is now abundant as far at least as Duluth.

In the woodland State of Michigan, the same progress is to be seen.

J. E. Fischer reported in 1920 that Coyotes had appeared and become numerous in the region at the north end of Lake Gogebic within the last few years.[23]

In 1911, Dec. 8, at Flint, Mich., I was shown a very big fresh-killed Wolf or Coyote, taken in Crawford County. I was on a flying visit through the town and saw the an mal for a few minutes only. It weighed probably 50 pounds, and looked like a cross between a police Dog and a Coyote; but I had no good chance to examine it and the owner would not sell it, not even the skull; however, I got a good photo of the creature.

Also, Norman A. Wood records it from Dickinson, Gogebic, Alger, Menominee and Marquette in the Upper Peninsula; and from Jackson, Monroe, Cass, Kalamazoo and Wayne in the Lower Peninsula.[24]

So that the State of Michigan is being possessed by two streams of immigration, one north and one south of Lake Michigan. Evidently Wisconsin is the breeding ground that is stocking the east with Coyotes.

Writing of the Coyote in Iowa (1911), Frank C. Pellett says that in 1867, Dr. J. A. Allen visited Iowa and described the Coyote as formerly quite numerous but in some sections now nearly extirpated; however, still common in the south part of Guthrie County. "From that time on until about 1890, Coyotes steadily decreased in numbers, until, apparently, they were all but exterminated. The survivors were extremely cunning, and an adult was seldom presented for bounty. During the last few years, a marked change is taking place. The country is now thickly settled and there seems little shelter for such large animals as Wolves, yet the Coyotes are increasing in numbers."[25]

He is coming back, he has solved the new riddle of life and is repossessing the ancient hunting grounds of his people.

Walter L. Hahn says: "There is no doubt that the Coyote has increased in numbers and extended its range in northern Indiana during the past 10 years."[26]

[23] Dice & Sherman: Mamm. Gogebic, Mich., no. 109, Mus. Zoöl., Univ. Mich., Feb. 25, 1922, p. 27.

[24] Annot. Check List of Mich. Mamm., Univ. Mich., April 1, 1914, p. 8.

[25] Forest & Stream, Mar. 25, 1911, p. 450.

[26] Mamm. of Kankakee Valley, Proc. U. S. Nat. Mus., June 15, 1907, XXXII, p. 462.

PLATE LXVII.—COYOTE HEAD

Life study made by E. T. Seton, in Jackson's Hole, Wyo., September 1, 1898

Even into Ontario has this enterprising prospector sent his scouts. A wild specimen was taken at Bosanquet, a few miles north of Thedford, Lambton County, Ont., Jan. 10, 1919, by George A. Martelle. The hunter took it for a Timber-wolf, but the skull and skin were secured and it proved to be the big Prairie-wolf, *Canis latrans*, a male. It is now No. 3877 in the Victoria Museum.

According to *Field & Stream*, June 1920, p. 159, "Prof. A. B. Recknagel, of Cornell University, reports that the first Coyote ever killed in Tompkins County, N. Y., was recently taken near Ithaca." There is, however, a possibility that this was an escaped captive

In the New York *Times* for Jan. 9, 1922, is an account of 2 Wolves in New Jersey. They were killing Pigs and, from the description, were either Coyotes or police Dogs.

A much more satisfactory record comes from Maryland. "On Feb. 5, 1921, an adult male Coyote was shot 5 miles northwest of Poolesville, Montgomery County, Md., by Mr. John A. Jones. The animal had been seen by several people in the region at various times since early in the winter, but it had successfully evaded guns. Its chances of living were lessened, however, when it became friendly with a female Airedale Dog, lost some of its wariness, and frequently came near the farm buildings where the Dog lived.

"It was killed with a shotgun in a field on the farm."[27] Another brave Samson betrayed by his Delilah.

It is not known whether this was an escaped captive or a traveller from the West. The skin is now in the U. S. National Museum.

### Marriage Customs

It is the opinion of all persons familiar with its habits, that this animal, like the Wolf, is strictly monogamous. It is usually seen single or in pairs, mostly in pairs. Every scrap of recorded evidence that I can find, as well as all my own observations, go to prove that, winter or summer, it is the rule for 2 Coyotes, a male and a female, to run, hunt, and live together. Several times I have taken the pair at the same time in a setting of four traps 10 or 12 feet apart, around a buried bait, showing how closely they kept together, though this was during the months of November, December, and January.

Even the pack of 6, later described by L. Wilmot, were in 3 pairs. And since this union holds the year round, we may safely infer that the species, like the Gray-wolf, pairs for life.

[27] Hartley H. T. Jackson, Journ. Mamm., Aug., 1922, pp. 186–87.

As a natural corollary, the male helps in raising the brood.

A. S. Barton says that the male aids the female with the young, at least till they are able to leave the den. In autumn, male and female are always found together, but he never saw the whole family together at this time as is the case with the Gray-wolf. The young may have scattered, or those observed may have been a barren pair; such are frequent.[28]

The actual mating season is about the middle or during the last two weeks of February.

## Den

Their usual denning place is one dug by the Coyotes themselves, in some sunny bank, but they may use an abandoned Badger hole. In any case, it is the mother who selects the den, and is credited with ownership of it—an interesting illustration of basic law.

The entrance is about 10 by 20 inches and is commonly concealed in the bushes. The actual nest is sometimes lined with a little grass and fur, and sometimes is quite bare. Barton sends the accompanying plan and description of one which he examined near Boissevain, Man. (Plate LXXI.)

Apparently it had been dug by the present owners, and was much the same as the dozen or so others he had investigated. The air-hole, located after close search was, as usual, an old Gopher hole, enlarged from below and directly over the nest; he supposes it was made to admit fresh air to the cubs.

I have not seen this ventilator, but may have overlooked it, as I had not heard of such a contrivance when last I examined a Coyote's den. It is well known that a family will have several dens, some of which are, as Barton says, "sleeping places for use during the heat of the day, which is one reason why so many attempts to dig out Coyote dens often fail of results."[29]

Writing of the Coyote in California, Dixon says:

"Breeding dens are carefully selected by the female with a view to effective concealment. The dens are thus usually difficult to locate, unless the female is watched or her tracks to the den are followed. The location and construction of the den vary with the topography of the country, as will be seen by the following instances At Redrock Valley, Siskiyou County, on June 7, J. O. Miller found a Coyote den. . . . This den was located in the base of a dead fir stub about 20 feet high and 4 feet in diameter at the ground. The centre of the stub was rotten and the nest chamber, $3\frac{1}{2}$ feet in diameter, had evidently been dug out entirely by the

[28] Personal information.

[29] Letter.

parent Coyote. The single entrance to the den was through a hole 15 inches in diameter at the base of the stub. No nest material other than the dry earth and rotten wood was noted in this den.

"At Earlimart, Tulare County, May 21, George Towne found a Coyote den on the bare open plain. The distance from the mouth of the burrow to the nest cavity was 26 feet. There were several lateral extensions of the burrow and the greatest depth reached was $5\frac{1}{2}$ feet. The top of the nest cavity was less than 2 feet below the surface of the ground." It was some 3 feet in diameter.[30]

The den has other uses besides its nursery or main purpose. The father needs a den of his own—a bachelor apartment—when he is not an acceptable member of the home group. The mother may need another den. She does not wish to be pestered with the pups the whole time, and other nursery dens are needed for a change-off, probably to help in getting rid of insect parasites.

Mills says: "The Coyote usually lies up in a den when not hunting; but at times he simply hides in underbrush or in ravines. A den I measured lay nearly 4 feet below the surface and had a length of 14 feet. It was expanded into a room-like place near the farther end, and there were a number of small pockets extending from it. The den may be made by the Coyotes themselves, or it may be the den of a Badger which they have re-shaped. Occasionally, they take advantage of cave-like places between large stones. The den commonly is in an out-of-the-way place and the entrance to it is concealed by stones or bushes."[31]

### Young

The carrying time of the young is the same as in the Wolf and the Dog; that is, 63 days.

Usually the young are born during the first half of April. April 9th in the New York Zoölogical Park and April 20th in the Washington Zoo represent the extreme dates at hand, though the hunters say that May litters are not unusual.

They number from 3 to 10, but are usually from 5 to 7.

They are blind and helpless, but covered with close, dark, ash-coloured fur.

It is generally believed that the father is not permitted to enter the home for some days after their birth—until, indeed, the young ones' eyes are open. But I have not been able to confirm this belief.

[30] Control of Coy., 1920, p. 383.

[31] Watched, pp. 89–90.

It is sure that he is never far away, and his devotion is vouched for by all who know him.

"Repeatedly," says Mills, "I have seen a mother or a father Coyote lure a hunter or trapper away from the den or spot where the young were hidden."[32]

Dr. W. T. Hornaday informs me that the father of the brood born April 9th took a keen interest in the young and became very officious, even vicious, in their defence. Their eyes opened on the eighth and ninth days, variously. When about 3 weeks old, the mother would carry them out into the sun or about the yard and back again. At 5 weeks, they were old enough to walk out alone.

At about 6 weeks, they show all the cunning ways and playfulness of puppies. They spend hours outside the den, wrestling, tusselling with old bones, digging, or sleeping in the sun, but are not known to venture forth at night.

How the den is sanitated at this time is not known. Possibly it is not purified. It may be because of its becoming foul or pest-infected that the mother moves the young to one of the other dens.

Keeper Carson assures me that in the Philadelphia Zoo, where the Coyotes frequently breed, the mother disgorges food for them regularly, exactly as does the mother Gray-wolf. When some 6 weeks old, both parents begin to bring solid food to the little ones, and the entrance to the den becomes littered with feathers, fur, bones, and other remains of their prey.

The young are so keen to see and welcome father and mother back with the new catch, that they make little pathways from the den to all the near points that give a view. Here they will sit and watch, but are ever ready to scurry home on the slightest alarm.

A glimpse of their life at this time was secured by Professor John Macoun, of Ottawa, Ont., while exploring near Crane Lake, Sask., in 1884. On June 23, he came on a Coyote family—father, mother, and at least 3 young ones. At his approach all ran into the den.

Barton tells me that as they get older, the cubs scratch out little pockets leading from the main den. In digging after them, these are frequently covered over and escape notice, so that some of the little ones are never found.

Similar testimony comes from Enos A. Mills, who says: "In 2 dens I examined, each youngster had a separate compartment or pocket for himself; and, judging from claw marks, probably he had dug this himself."[33]

[32] Watched, p. 85.

[33] As above, p. 90

I have a most interesting photograph by William R. McFadden, of Denver, showing 9 young Coyotes playing about the door of their den. This was taken in June. The young were about one third grown; both parents were seen in attendance and when they found that their home was discovered, they moved the young ones elsewhere. (Plate LXXIII.)

This habit is quite general among Coyotes. Barton writes that on May 21, 1905, he found a den in a ravine a mile out of Boissevain, Man. The mother was running around, and the pups were squealing deep in the hole. But when he went back next day to dig them out, the litter had been moved, evidently to a distance, for a careful search in the neighbourhood failed to locate them.

A similar habit is recorded by Dixon.[34]

In July the young are half-grown. They now begin to run with their parents and learn the arts of hunting. At this season the mother especially guards and trains them carefully. Her warning call of danger is a very distinctive cry.

### The Heroic Little Mother

Some delightful glimpses of their family life at this time are recorded by Enos A. Mills, whose opportunities were as rare as his gifts. On one lucky occasion he says:

"Nine healthy Coyote puppies were playing in the sunshine with all their might. After days of searching I had at last discovered their den. The puppies had not noticed me and I enjoyed watching their training for the game of life. They wrestled, played at fighting, rolled over and over, bit at one another's feet and tails, and occasionally all mixed in one merry heap.

"Their mother came along the hillside above the den. She walked back and forth on the skyline where I could not miss seeing her. Then she came nearer and passed within 30 or 40 feet of me. I kept my eyes upon the puppies and pretended not to see their mother. She turned and passed still closer to me. This time she was limping badly on one forefoot and holding up one hind-foot. She was making every effort to have me follow her—to lure me away from her home and her puppies.

"A moving object down the slope caught the attention of the puppies. As soon as they made out what this was, they scampered racing away. Going only a short distance, they sat down, as though at a dead-line. Evidently there is a small zone of safety surrounding the den beyond which the puppies are not allowed to go. At this moment, Mr. Coyote appeared from

[34] Control, p. 383.

down the slope, with a Jackrabbit in his jaws. He was coming quickly along and had not suspected my presence. How eagerly the puppies watched him! As he came up, they commenced snapping and tearing at the Rabbit he carried. Mrs. Coyote hastily joined them and all scurried into the den. The following morning the den was deserted. It is common for Coyotes to move their puppies promptly to another den when they think they are discovered.

"Another mother Coyote decoyed me into watching a vacant den. Her children were in another den a quarter of a mile away. In carrying food to them, she went out of her way to enter the vacant den, then left it by a different entrance and proceeded by a circuitous route to the waiting puppies. Both of the old Coyotes hunt and carry food to the den for their puppies."[35]

By the first of August the den is deserted, and now, apparently, the young scatter and shift for themselves, never travelling or hunting in a pack as do the Gray-wolves.

There is evidence, however, that the motherly care continues, for Barton tells me that on one occasion he was hunting a young Coyote, when the mother coursed along a neighbouring height, uttering the prolonged, quavering squall, or danger-call. Barton had 2 foxhounds in leash. They were after her and very brave as long as she ran away, but a few minutes later came racing back toward him in terror, closely *pursued by the heroic little mother*. They were so embarrassed by the leash, and she was so active, that she ran around and bit them as often as she chose. Imagine the fight—a 25-pound Coyote against two 75-pound Dogs, with the Dogs in disastrous defeat!

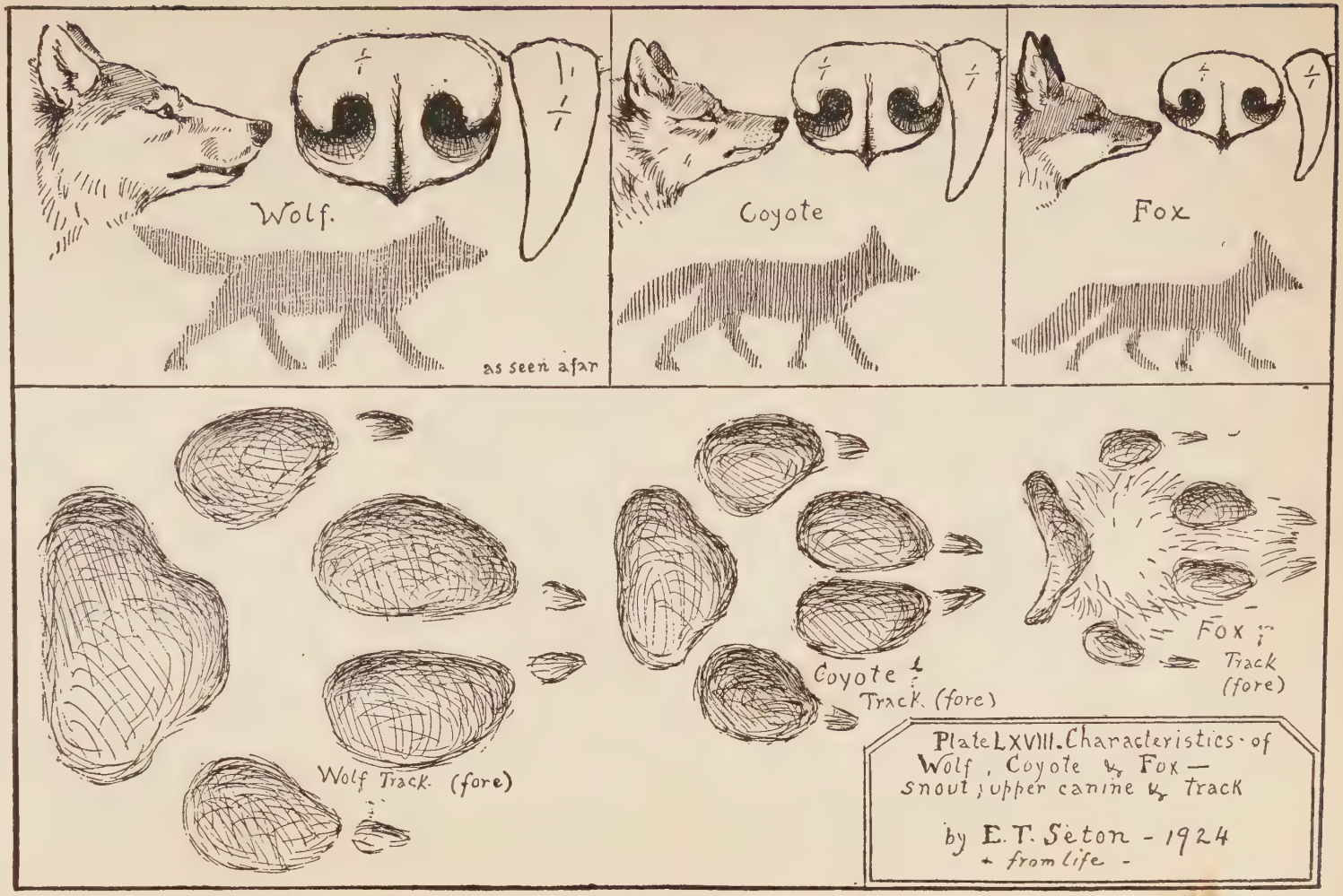
In October, the young are as big as the parents. Food is still abundant on the Northern prairies, although the Ground-squirrels have retired to their winter quarters. The Coyotes are sleek and fat, but from this time on the struggle for life becomes hard and deadly.

Wolves, it is well known, do not breed till 2 years old, and it is most likely that Coyotes are governed by the same law.

In the North, one litter each season is the fixed law, so far as I can discover. But in California, they seem to have a more prolific breed; the following, by Dixon, is a surprise:

"Second litters . . . are not unknown. A female Coyote, taken by the author in the vicinity of Bakersfield, Kern County, on May 6, 1918, showed plainly that she had nursed young within the previous 24

[35] Watched, pp. 84–85.


Wolf.
as seen afar
Coyote
Fox
Wolf Track. (fore)
Coyote ½ Track. (fore)
Fox ½ Track (fore)
Plate LXVIII. Characteristics of Wolf, Coyote & Fox — snout; upper canine & track
by E. T. Seton - 1924
+ from life -

hours, and there was still an abundance of milk in the milk glands. This nursing female contained 7 small embryos, each less than an inch in length. This specimen (Mus. Vert. Zoöl. 28722) affords a reasonable basis for the statement that 2 litters may sometimes be raised in one year."[36]

## Age

The ordinary expectation of life in the Coyote—five times the period needed for growth—should be not more than 10 years. But they often exceed this. Enos A. Mills says: "I kept track of one for 8 years, who appeared mature when I first met him and showed no signs of decay when I saw him last."[37]

In the National Zoo at Washington, they had a female which lived for 14 years, although adult at arriving.[38]

Let us pray that every blithe and joyous Coyote in the West to-day may scoff at government hunters and greedy trappers, and live to the full his adventurous tale of days.

## His Meat

While a hunter by profession and by choice, there is nothing in the way of fish, flesh, or fowl, dead or alive, ancient or modern, that the Coyote disdains for food. Ground-squirrels, Mice, Rabbits, frogs, snakes, eggs, and fledgling birds are on its bill-of-fare, and the hen-yards as well as the sheep-folds are levied on in times of need.

In the great dry Southwest, it finds, besides big-hoofed creatures, an abundance of small rodents, birds, reptiles, fish, and crustaceans.

"Three horned toads (*Phrynosoma*) were found in the stomach of a specimen killed June 3, 1898, in Big Smoky Valley, Nevada, by Vernon Bailey. On the low tropical coast of eastern Mexico and Texas, members of the Biological Survey have often seen Coyotes searching the beach for crabs, fish, and turtle eggs."[39]

In the Northwest, he finds a plenty of Mice, Ground-squirrels, and in the early summer, eggs and small birds. In the winter his precarious living is chiefly on winter-killed Cattle, Horses, and Sheep.

On the Athabaska River in the October of 1907, I found the tail-feathers of a Chipmunk in the dung of a Coyote. I wonder if the rest of the Chipmunk got away.

[36] Control, p. 382.

[37] Watched, p. 89.

[38] Rep. Nat. Zoo., Wash., 1920, p. 80.

[39] Coyotes, p. 12.

Enos A. Mills says: "In certain localities, the Chipmunks retire in autumn to their holes, fat and drowsy, and temporarily fall into a heavy sleep. Before the earth is frozen, they are energetically dug out by the Coyotes."[40]

On another occasion, after following a Coyote for days, to learn his way of life, Enos A. Mills wrote: "Tracks and records in the snow showed that for 2 days a Coyote did not capture a thing to eat During this time, he had travelled miles. He had closely covered a territory about 3 miles in diameter. There was game in it, but his luck was against him. He was close to a Rabbit, grabbed a mouthful of feathers—but the grouse escaped—and even looked at a number of Deer. At last, after more than 2 days, and possibly longer, he caught a Mouse or two."[41]

The winter is, of course, the season of peril for all creatures that do not store up a full supply of food, or hibernate. Can it stand the winter? is the crucial test of species that move North. Probably the chief thing that carries the Coyote race through is the new supply of food brought in by their enemy —that is, winter-killed Sheep and Cattle. These are dragged forth from time to time, and at each carcass half-wild Dogs contend in nightly feast with Coyotes, or both retire while a big Gray-wolf fills his capacious maw.

Even in the summertime he may be plagued with an empty and complaining belly and be glad from choice or love of change to make some wholly new entry on his list of diet—insects and fruit, no less.

In California I saw many melons eaten into by Coyotes. When I visited John Muir on his ranch at Martinez, Oct., 1899, I saw many signs of Coyote damage and many tracks right in his garden.

In the Far North, on the Athabaska River, I found the Coyote's dung in October composed chiefly of seeds of the *uva-ursi*.

Sample dung-pellets gathered on the Athabaska River, Alta., in late October, 1907, were sent to the Biological Survey at Washington for analysis. The following remains in them were identified by Edward A. Preble and W. L. McAtee:

*Rosa* (*acicularis?*), many seeds; *Ribes*, a great many berries; *Aralia nudicaula*, many berries and seeds; *Microtus drummondi*, some hair (apparently) and portion of skull; *Peromyscus*, incisor (apparently *Peromyscus*); fish, portion of skull of some fish; waterbeetles (*Corixa*), remains of a good many; grasshoppers (*Melanoplus borealis*), remains of about 20; ant, head of one.

Lantz says in his report:

"The stomachs examined contained mainly animal matter, but in 2

[40] Watched, p. 93.

[41] As above, p. 166.

cases, vegetable remains were found. One examined by Vernon Bailey contained a quantity of ripe cultivated plums, and William Lloyd found a Coyote that had eaten mesquite beans. In northern Arizona, Doctor Merriam saw a Coyote eating a watermelon, and a correspondent at Russell, Kans., says that they sometimes eat ripe melons. In California they eat peaches, apricots, grapes, and other fruits. They eat also juniper berries, manzanita berries, and the fruit of the prickly pear (*Opuntia*).

"Only one case of insect-eating has been observed by the Biological Survey. The same animal that had eaten plums had in its stomach the remains of a large cricket (*Stenopelmatus fasciatus*).[42]

Dr. A. K. Fisher testifies: "At times the Coyote feeds entirely on large insects, as May beetles, crickets, and grasshoppers, and accomplishes much good."[43]

To this Dixon adds: "In San Diego County, a Coyote observed by the author, jumped up and snatched ripe fruit from the lower branches of a prune tree. Ripe grapes and watermelons were commonly eaten by Coyotes in this locality."[44]

### His Prairie-dogs

In the October of 1893, while living in New Mexico near Clayton, I had an opportunity of watching a joint hunt of Prairie-dogs by 2 Coyotes, no doubt a pair. Early in the morning I was on a rugged hill overlooking a plain on which was a Prairie-dog town. One Coyote was in an arroyo or dry watercourse hidden from view. The other walked openly and calmly toward a Prairie-dog that was barking vigorously on its mound. The Coyote paid little heed, but walked so as to pass within 20 yards. The Prairie-dog dodged down. Then Coyote No. 1 continued his leisurely walk, while Coyote No. 2 rushed forward and hid behind another mound. Very soon the Prairie-dog began to peep out, and seeing the Coyote at a safe distance, he scrambled on to his high outlook to hurl defiant little barks after the foe. But the Coyote behind sprang and all but caught him before he scrambled into safety.

In this case the combination failed, but evidently it must oftentimes succeed.

Dr. G. B. Grinnell has given an admirable description of the Coyote as a stalker.

"Last summer," he says, "while we were haying, an interesting ex-

[42] Coyotes, pp. 11–12.

[43] Yearbook, Dept. Agri., 1908, p. 189.

[44] Control, p. 382.

ample of a natural pointer was seen not far from the house. The loaded hay wagon was coming back from one of the meadows, when a Coyote was seen 40 or 50 yards from the road, apparently on a dead point. He was standing absolutely still, his nose and tail straight out in a line, and one forefoot lifted from the ground. Just before him there was a very slight rise of ground, but the men who were riding on top of the load of hay could see over this, and saw that he was pointing a Prairie-dog which was feeding near its hole, just on the other side of the elevation. They were so interested in the sight that they stopped the wagon and watched. Every little while the Prairie-dog would sit up and look about, and when he did this the Coyote would stand absolutely without motion. When the Dog dropped down on all four feet and began to feed, the Coyote would very slowly and stealthily creep up a few feet nearer. This thing went on for some minutes, the Dog not seeming to notice the Coyote, which at the last must have been in plain sight. The last time the Dog dropped down to feed, the Coyote made a swift rush, covering 12 or 15 feet, picked the little animal up, and then for the first time noticing the hay wagon, stood for a moment with his prey hanging across his mouth and then trotted slowly off up the hill."[45]

Lantz says of the same game:

"The Coyote captures them by hiding behind clumps of weeds or bunches of grass at some distance from the burrows. When the unsuspecting rodent, in feeding, approaches near enough, a few leaps enable the Coyote to secure it. The grass in a Prairie-dog 'town' is usually cropped very short, and all tall-growing weeds are cut down.

. . . . . .

"But clearing the Prairie-dog town of weeds is not sufficient to baffle the Coyote. In the absence of hiding places he takes to new methods of hunting. J. H. Gaut, of the Biological Survey, records his observations in a Prairie-dog town in New Mexico:

"'The Coyote started at one end of the town and ran at lightning speed in a straight line until he cut off one from its burrow. When the Prairie-dog saw that it could not get to its hole, it stopped and began to kick until the Coyote caught it and killed it in very much the same way that a Dog kills a Rat.'"[46]

### His Antelope-jacks

Thus I have given the little and least chapters of his daily life, but he has big and sporting instincts that lead him to kill bigger and nobler game.

[45] Forest & Stream, Dec. 26, 1896, p. 511.

[46] Coyotes, pp. 12–13.

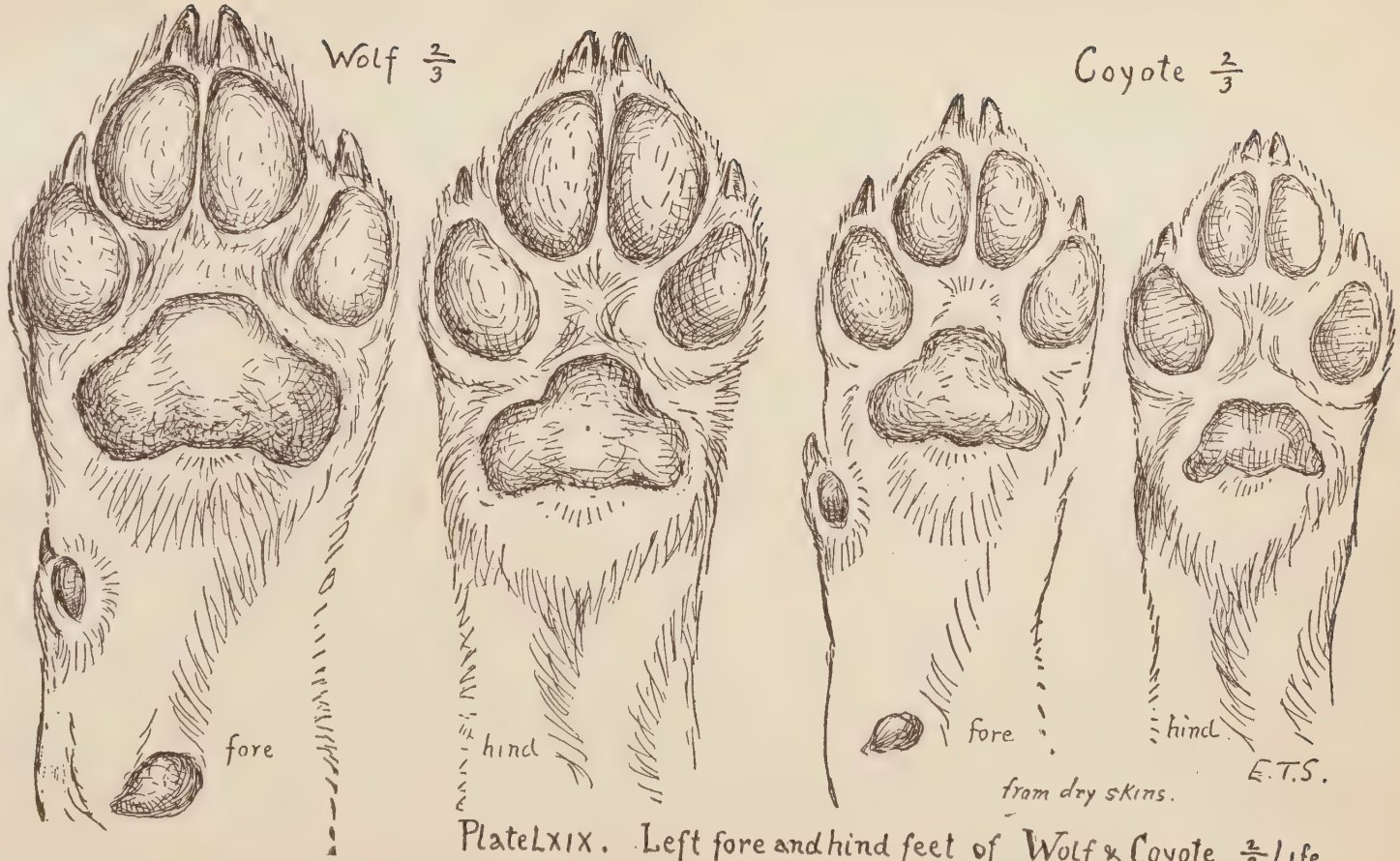



Plate LXIX. Left fore and hind feet of Wolf & Coyote 2/3 life

In the chapter on the Antelope Jackrabbit is related the method by which these crafty little Wolves secure that beautiful creature of the dull wits and the wingéd heels.

Lantz also says of the Coyotes:

"Sometimes they have been known to hunt Jackrabbits in company. While a single Coyote would not be able to run down a Jackrabbit, by hunting together, taking turns in the drive, and by taking advantage of the tendency of the Hare to run in a circle, they are able to capture it. Eyewitnesses to such a performance state that they do not fight over the division of the Rabbit's carcass, but they all obtain a share."[47]

### As a Sheep-killer

Coyotes rarely molest Pigs, and calves only when other game is scarce and the calf very weak. But they are very troublesome among other live stock. In the summer they kill many turkeys that roam afield far from the protection of the house Dog, and Sheep are particularly subject to their inroads. They have, indeed, nearly put an end to wool-raising in the Province of Manitoba. They destroyed all Barton's Sheep, invariably selecting the fattest and best. At first it was found sufficient to put bells on several of the flock. But the Coyotes have got so far accustomed to these that the bells now protect only the Sheep that wear them; some shepherds aver that these sagacious little Wolves will get up at night and listen for the Sheep bells, so as to know where an easy supper is awaiting them.

George H. Measham writes me from Shoal Lake in Dec., 1899: "Wolves are on the increase and becoming a regular pest. Many people have abandoned keeping Sheep on their account. Although a bounty of $2 is paid for them, they manage to keep out of danger in a way only equalled by themselves."

When man brought his myriads of wool-bearing id ots into the Coyote country of the Southwest, it was, of course, like throwing a crate of chickens into a Fox's den. Coyotes certainly kill lambs when they can find them.

The Chief of the Biological Survey says: "Coyotes in New Mexico were reported taking 3 to 6 lambs each night from one ranch, notwithstanding the fact that the Mexican herders were sleeping in close proximity, and that the usual devices were employed to keep the an mals away. After a Bureau hunter had killed 7 large old Coyotes and 2 Wildcats in the vicinity, the losses entirely ceased."[48]

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[47] Coyotes, p. 12.

[48] Rep. Chief Bur. Biol. Surv., Washington, Sept. 4, 1920, p. 4.

In contrast to this is the following by Ranger Gray of California Game Refuge:

"Earl Moore, T. Flournoy and other men who have been handling Sheep for many years in these mountains advise me that they never saw a Coyote actually kill a Sheep. However, they state that they have seen them driving and worrying the Sheep, and upon following the trail they invariably found dead Sheep scattered along the route. The greatest losses among this class of stock from the source mentioned is to small bunches separated on the range from the main bands, and left on the range during the night unprotected."[49]

Before we judge the Coyote guilty of all Sheep-killing that takes place where there are no Gray-wolves, let us remember that in 1891, the loss from Dogs in Ohio was placed at $152,034 and $200,000 in Missouri.[50]

"Although Wolves [Coyotes] have done serious injury to Sheep owners in this State [Iowa], the worthless Dogs that roam freely about the country have done *ten times more*. A bounty placed on the head of every Dog not wearing a collar with his owner's name on it, and a bond to make every Dog owner responsible for his mischief, would do more for the local Sheep industry than anything else that could be mentioned."[51]

If we condemn the Coyote to death for sheep-stealing, we are in decency bound to hang all the Dogs on the bigger branches of the very same tree.

### As a Cattle-killer

Full-grown Cattle and Horses are safe from Coyotes' attacks. But the new-born calves are commonly killed when the mother leaves them to seek water.

On Oct. 3, 1901, while driving near Meeker, Colo., I saw a cow defending her new-born calf from a Coyote. The calf was able to stand, and 2 or 3 steers lent some aid to the cow. The Coyote walked about openly and quietly, or sat on his haunches some 20 yards away. The cow and steers went on feeding, but kept an eye on the Coyote, and the mother always managed to be between the calf and his foe. Occasionally one of the defenders would throw up his head, shake his horns, snort, and even run a few steps at the Coyote, but there was a marked absence of action in the little drama. Doubtless it would continue so, unless the sagacious little sport got a chance to rush in and inflict a deadly wound.

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[49] E. V. Jotter: Deer-killing by Coyotes, Cal. F. & G., Jan., 1919, p. 27.

[50] Sheep Industry in the United States, U. S. Dept. Agri., 1892.

[51] Frank C. Pellett: Forest & Stream, Mar. 25, 1911, p. 450.

### As a Deer-killer

When Deer are vigorous and not rendered helpless by deep snow, they have little to fear from the Coyote. But the time of Coyote famine and Deer helplessness unfortunately come together in California, at the end of winter when the snow is deep, or early in spring when the Deer are worn out with the long siege of it.

E. V. Jotter makes a long report on Deer-killing by Coyotes in the *California Fish & Game* for Jan., 1919, pp. 26–27, from which I make these extracts:

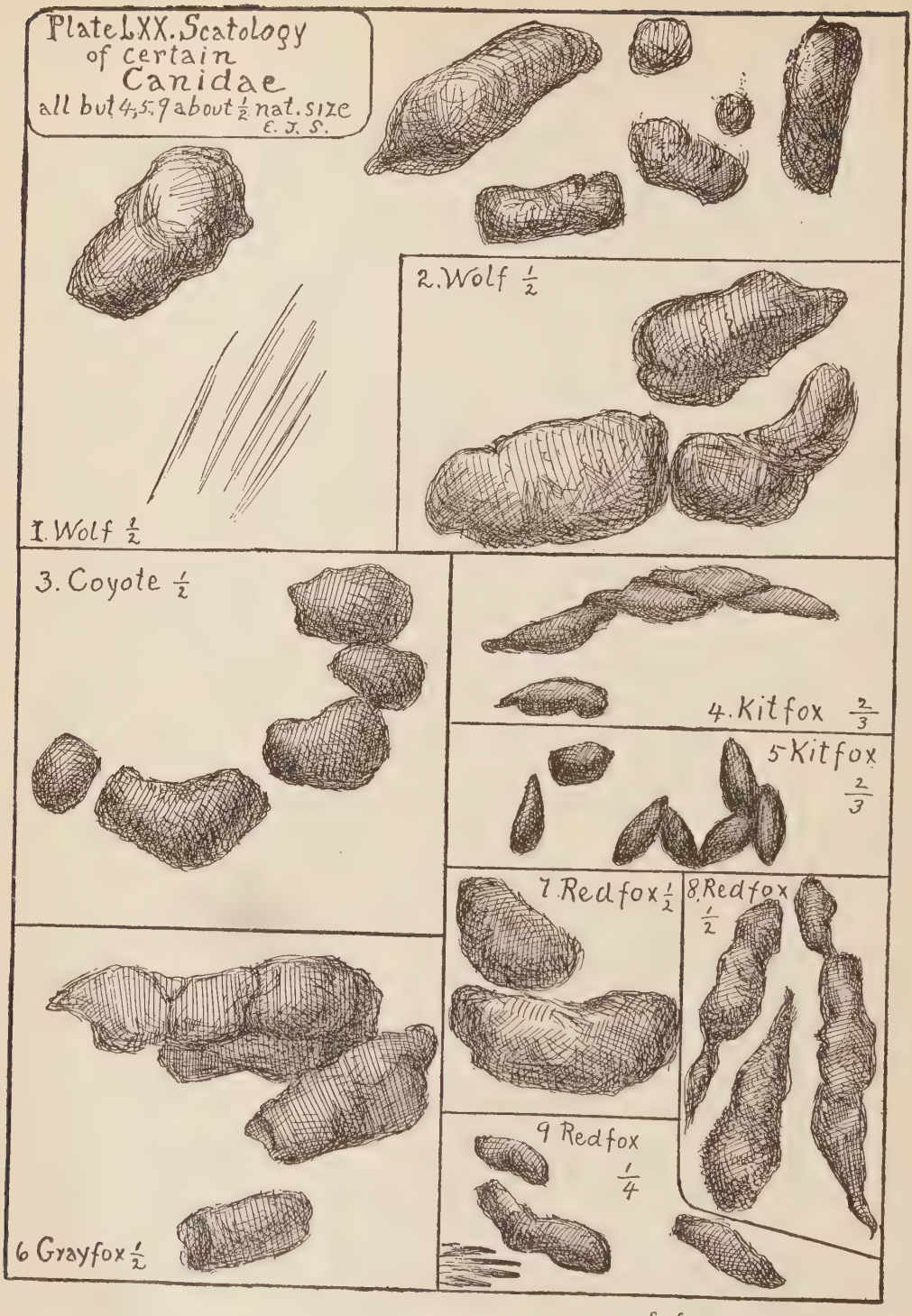
"Bert Higgins, who runs a trap line within the Trinity Game Refuge, reports finding along this one line during one month, the remains of 15 Deer killed by Coyotes. Ranger Bucklew, in April, 1916, saw a full-grown doe, apparently in good condition, pulled down by one Coyote.

"Mr. Wm. Friend writes as follows concerning his experience with Coyotes in the Game Refuge:

"'In regard to the Deer I found killed by Coyotes in the Game Refuge, will say I commenced trapping between Little Creek and Bear Creek on Feb. 1, 1916, and between that date and March 2, 1916, I found the remains of 17 Deer killed by Coyotes.

"'They were all sizes from large bucks to fawns, but mostly small Deer. The snow was about 2 feet deep, and the Deer had collected near the river and in gulches. After the snow settled, the Coyotes could run on top, but the Deer broke through, so it was an easy matter for the Coyote to catch them. In one gulch I came down, I found 8 Deer that had been killed at different times—one of them had been killed recently and none of them were over 10 days. In many other sheltered places I found remains. In one instance, about Feb. 1, T. H. Campbell and I were riding along the road near Philip Habor's place and saw where Coyotes had just killed a spike buck and were enjoying a feast when we frightened them away. I also have a large pair of antlers I brought home from one of their victims. It is not only when the snow is on, but in the spring when the Deer are weak and poor, that they destroy a great many. I was coming home from my traps after the snow had gone, and not half a mile from the Van Matre place I saw 2 Coyotes that had a large buck run down, and would have killed him if I had not happened along at that time. The Deer was not able to get up the bank then.'"

There can be no doubt that the Coyote is blamed for an immense amount of damage really done by Dogs. There were 3 or 4 wild Deer on my Connecticut homeland 10 years ago, but the Dogs got them all. The last




See footnote on opposite page.

seen was in the autumn of 1919, running with 50 yelling, cowardly cur Dogs after it.

### As a Hunter of Antelope

The swiftest fourfoot on the Plains was the Antelope. In an open race, the Coyote would have no more chance of capturing it than of catching a Jackrabbit. But he sometimes succeeds by cunning when all his strength and speed might fail, as the following instances show:

John B. Goff, the hunter, tells me that while freighting between Rifle and Rawlins, Colo., some years ago, he saw 2 Coyotes chasing an Antelope. They worked a distance apart, keeping the Antelope running zigzag between them, so that it really did four times the running of either. It was nearly exhausted and ran up to his Horses for protection. The Coyotes then held off.

In an article on "Coyote Partnership," Dr. George Bird Grinnell, referring to the Coyote plan of running an Antelope down by relay chasing, says:

"Of course the Coyotes do not catch every Antelope they start. Sometimes the game runs such a course that it does not pass near any of the waiting Wolves, and only the one that starts it has any running to do. In such a case the pursuit is at once abandoned. Sometimes the Antelope is so stout and strong that it tires out all its pursuers. . . . Two or three years ago I camped one afternoon near Rock Creek, and as there was very little feed, we turned the Horses loose at night to pick among the sage brush and grease wood. Early in the morning before sunrise, while the man with me was getting breakfast, I started out to get the Horses. They were nowhere to be seen, and I climbed to the top of the hill back of camp, from

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PLATE LXX—SCATOLOGY OF CERTAIN CANIDÆ

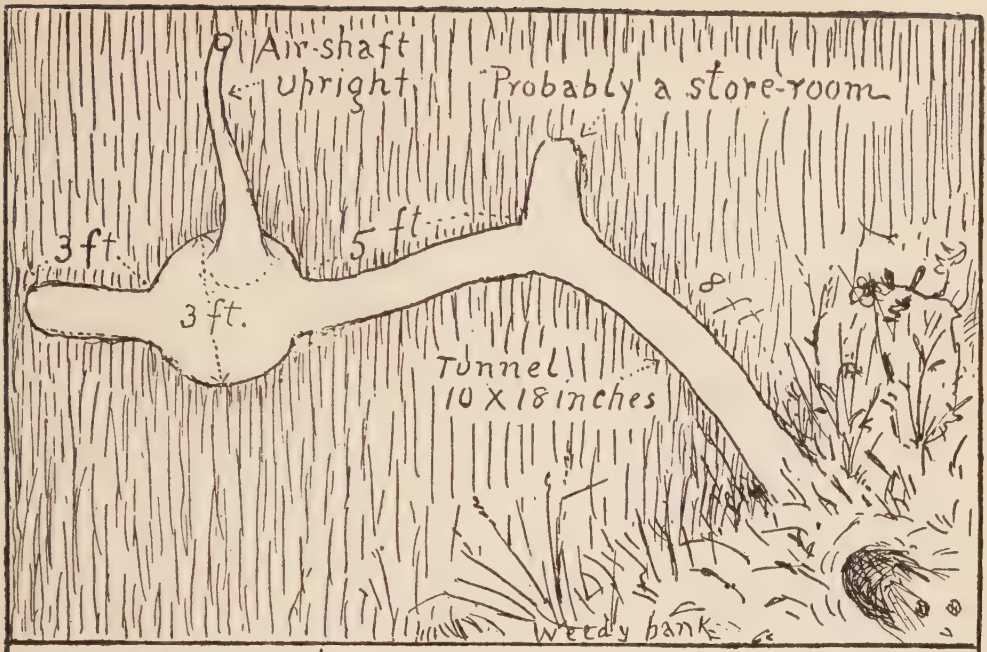
All but 4, 5, and 9 are about half natural size.

1. Wolf, very large. Banks of Athabaska River, Oct. 19, 1907. Chiefly of Rabbit fur. The scratch mark or signature was very plain.
2. Wolf. Algonquin Park, Ontario, Aug. 18, 1922. A solid mass of Deer hair.
3. Coyote. Philadelphia Zoo, Feb. 7, 1924.
4. Kit-fox. Philadelphia Zoo, Feb. 7, 1924.
5. Kit-fox. Philadelphia Zoo, Feb. 7, 1924.
6. Gray-fox. Philadelphia Zoo, Feb. 7, 1924.
7. Red-fox. Quebec, 40 miles east of Kippewa, Sept. 5, 1905. Composed almost entirely of Mouse fur, with some of Redsquirrel and Chipmunk.
8. Red-fox. Yellowstone Park, July 5, 1897. Chiefly of soft, dark fine fur, probably from Yellow Rockchuck.
9. English Red-fox. Essex, England, Jan. 21, 1906. Noted chiefly on account of the unmistakable claw-mark signature.

which, as it was the only high place anywhere about, I felt sure that I could see the missing animals. Just before I got to the top of the hill, an old doe Antelope suddenly came in view, closely followed by a Coyote. Both of them seemed to be running as hard as they could, and both had their tongues hanging out as if they had come a long way. Suddenly, almost at the heels of the Antelope—much closer to her than the other Wolf—appeared a second Coyote, which now took up the running, while the one that had been chasing her, stopped and sat down and watched. The Antelope ran quite a long distance, always bearing a little to the left, and now seeming to run more slowly than when I first saw her. As she kept running, it was evident that she would either run around the hill on which I stood or come back near it. At first I was so interested in watching her, that I forgot to look at the Wolf that had stopped near me. When I did so he was no longer at the place where he had stopped, but was trotting over a little ridge that ran down from the hill, and watching the chase that was now so far off. He could easily have run across the chord of the arc and headed the Antelope, but he knew too well what she would do to give himself that trouble. After a little, it was evident that the Antelope would come back pretty near to the hill, but on the other side of it from where she had passed before, and the Wolf which I had first seen chasing her trotted out 200 or 300 yards on to the prairie and sat down. The Antelope was now coming back almost directly toward him, and I could see that there were 2 Wolves behind her, one close to her heels and the other a good way back. The first Wolf now seemed quite excited. He no longer sat up but crouched close to the ground, every few moments raising his head very slowly to take a look at the doe, and then lowering it again so that he would be out of sight. Sometimes he crawled on his belly a few feet farther from me, evidently trying to put himself directly in the path of the Antelope, and this he seemed to have succeeded in doing. As she drew near him I could see that she was staggering, she was so tired, and the Wolf behind could at any moment have knocked her down if he had wanted to, but he seemed to be waiting for something. The Wolf that was following him was now running faster and catching up.

"When the Antelope reached the place where the first Wolf was lying hidden, he sprang up, and in a jump or two, caught her neck and threw her down. At the same moment the 2 Wolves from behind came up, and for a moment there was a scuffle in which yellow and white and gray and waving tails were all mixed up, and then the 3 Wolves were seen standing there tearing away at their breakfast."[52]

[52] Forest & Stream, Feb. 6, 1897, p. 104.




Plan of Coyote Den opened by A.S. Barton at Boissevain, Manitoba.

Plate LXXI. Coyote tracks (in Phila. Zoo.) showing greater size of outer hind toe marks; there is nothing corresponding in the toes themselves.

### His Storage Habit

Like many others of the family, the Coyote has the frugal habit of storing food for future use; whether it can thus effectually hide it from plunderers, or whether indeed it always remembers the spot afterward, I cannot determine, though I think it unlikely that an animal with its high mentality, its sense of locality, and fine nose, could fail of going to the spot at will.

The following incident witnessed by A. S. Barton, of Boissevain, Man., is a good illustration of the storage habit:

"I was mowing hay in my coulee when I noticed, some distance away, a Coyote carrying something in his mouth. He trotted down the hill and with some difficulty through the long grass, but presently stopped and began to bury his booty in a mole-heap, covering it with his nose, as a Dog does. On my approach he decamped and watched my proceedings from the nearest hill, and, curious to know what he had been burying, I unearthed his cache, and found, to my surprise, a fine turkey gobbler, still warm and uninjured, except that its neck was broken. I had no time and less inclination to advertise for an owner, but accepted 'the goods the gods gave' and carried my prize home. Our next Sunday dinner was much appreciated, and we cheerfully drank the health of the purveyor, and of my unknown neighbour also."

### His Speed

The speed of the Coyote is great, and has often been the subject of admiring comment, but I think it has been overrated. After collecting data of various kinds, such as actual known records of Dogs and Horses, also the comparative records of Dogs and Hares, or Horses and Foxes, Wolves and hounds, hounds and automobiles, I have attempted a scale of comparative speeds. This appears in a different form in the "Antelope Life", Vol. III.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Blood Race-horse | covers a mile in about | | | | | 1 | " | 40 | sec. or at the rate of | | | | | | 34 | miles per hour | |
| Pronghorned Antelope | " | " | " | " | " | 1 | " | 50 | " | " | " | " | " | " | 32 | " | " | " |
| First-class Greyhound | " | " | " | " | " | 2 | " | 0 | " | " | " | " | " | " | 30 | " | " | " |
| Texan Jackrabbit | " | " | " | " | " | 2 | " | 10 | " | " | " | " | " | " | 28 | " | " | " |
| Red-fox | " | " | " | " | " | 2 | " | 20 | " | " | " | " | " | " | 26 | " | " | " |
| Northern Coyote | " | " | " | " | " | 2 | " | 30 | " | " | " | " | " | " | 24 | " | " | " |
| Foxhound | " | " | " | " | " | 2 | " | 40 | " | " | " | " | " | " | 22 | " | " | " |
| Gray-wolf | " | " | " | " | " | 3 | " | 0 | " | " | " | " | " | " | 20 | " | " | " |

Many hunters would set the Kit-fox or Swift also above the Greyhound, especially for a short race, but I have had no personal experience with the

species in a chase. The little Prairie Cottontail can, I believe, get away from the Swift in a hundred-yard dash; he cannot keep it up for long, but his "muzzle" velocity is incredible and baffles the eye—not a leg, not a Rabbit is to be seen, nothing but a white streak across the prairie, till he promptly disappears in some burrow.

What actually counts in the race is, as usual, the *trifle more* speed that each animal can command.

For example, the Gray-wolf makes 650 yards to the minute and the Coyote about 700, but that 50 yards makes all the difference between living and dying. That 50 yards margin is probably the foothold on which the whole Coyote race has been built up.

These rates, it will be seen, trench on the proper realm of birds: small birds make only from 25 to 30 miles an hour.

It is a well-known principle that the special development of an animal is its most variable part. Thus the peculiar bell in the throat of a Moose varies enormously; the bill of the long-billed curlew, the neck-feathers of the ruff, the spots of the Ocelot, the white bands of the Skunk, the horns of the Elk, are so varied that rarely two are found just alike. Speed is one of the peculiarities of the Coyote as it is of the greyhound, and we must, therefore, look for great variations of rate. I have selected an average for my calculation, but there are occasional individuals, Coyotes of rare gifts, whose speed and endurance would put them very near the top of our scale.

An individual of this description lived for 3 years on the north slope of Turtle Mountain, near Boissevain, Man. He was known as the "Greyhound Coyote." A. S. Barton hunted him many times with first-class greyhounds, Dogs which ordinarily had no difficulty in catching a Coyote, and, though the chase was several times over open prairies, he always left the Dogs behind in a straight 3-mile run, and safely reached his retreat in the wooded ravines of Turtle Mountain, thanks, not to any stratagem, but to his speed. It is not known what his end was; he may, indeed, be living yet. I hope so.

## The Coyote a Good Citizen

The Biological Survey has gathered a mass of evidence for and against the Coyote, founded chiefly on its food habits. This is presented by Prof. D. E. Lantz in a bulletin from which I quote:

"*Beneficial Habits.* Among the mammals included in the food of the Coyote are many injurious species; and, so far as their food is confined to these, the animals are decidedly beneficial to the farming interests of the country. The destruction of Rabbits, both large and small species, is of great advantage, especially on the plains and in the cultivated valleys, where their depredations are keenly felt by the settlers. The various species of Jackrabbit have often been observed as included in the Coyotes' fare, and the smaller Rabbits are also habitually eaten. The Coyotes usually catch the Rabbits by lying in wait behind the bushes and bunches of grass near their paths, and pouncing upon them as they pass. . . . The constant warfare of many Coyotes upon these rodents has much to do in keeping down their numbers; and the abundance of Rabbits in some sections of the West has been largely attributed to a local decrease in the number of Coyotes, caused by an unusual activity against them which had been stimulated by high bounties.

"Prairie-dogs (*Cynomys ludovicianus* and other species) are also a staple Coyote food. . . .

"Besides Rabbits and Prairie-dogs, the food of the Coyote is known to include the following mammals:

"Rice Rats (*Oryzomys*), Kangaroo Rats (*Dipodomys* and *Perodipus*), Wood Rats (*Neotoma*), Ground-squirrels (*Ammospermophilus*, *Callospermophilus*, and *Spermophilus*), Woodchucks (*Marmota*), Voles, (*Microtus*), Pocket Gophers (*Thomomys*), Chipmunks (*Eutamias*), and Pocket-mice (*Perognathus*). All of these are more or less harmful, and the Coyote performs an important service in preying upon them. The service is not an occasional or a spasmodic one, but lasts throughout the year and throughout the life of the Coyote. When the number of animals taking part in the work is considered, the enormous importance of its bearing in maintaining the 'balance of nature' becomes apparent.

"The Coyote is useful also as a scavenger. In the prairie country, especially in winter, it comes into towns at night searching for garbage thrown into the alleys. Here it finds remnants of meat from the table, offal

from game, and similar prizes. When hungry it will reject no animal food, not even carrion. The slaughterhouses near the towns are favourite feeding places, and the animals are often shot there by moonlight. On the ranges, they soon consume dead Horses and Cattle, leaving the bones clean."[53]

In the Southern States, in India and other countries, buzzards and vultures are protected because they clean up all carrion and save the country from many a possible pestilence bred of such decay. For precisely the same reason we owe the Coyote a debt of gratitude.

A remarkable article by W. B. Lawrence, of Millbrae, Cal., appears in the *California Fish & Game*, Oct., 1922, pp. 230–31. This is a summary of it: On 10¼ square miles of the Spring Valley Water Company land near San Francisco, trappers caught in one season 84 fur-bearers, including 17 Coyotes, 4 Coons, 18 Skunks, 8 Wild-cats, 15 Opossums, besides sundry Civet-cats, Foxes, Weasels, and common Cats run wild.

He finishes with this significant paragraph: "Quail have decreased in number, so doubtless predatory animal control is but one factor in the problem, and there are doubtless others of importance that would be revealed by a more intensive study."

### The Charges Against the Coyote

In the Lantz paper already quoted, the only count that he makes against the Coyote is this: "In Aug., 1903, a member of the Biological Survey met a Coyote carrying a Weasel in the Pecos River Mountains of New Mexico at an altitude of 11,600 feet. The Coyote, frightened, dropped its prey and ran off."[54]

Note the assumption that the Weasel is a beneficent animal and that therefore the Coyote was in mischief.

In the chapter on its food, the destruction of some Sheep is admitted, though it is *not one tenth of that done by Dogs*. The answer is that Sheep in small fields properly fenced are not in danger, and Sheep on the open range or in the National Forests without any restriction have proved a devastating plague.

The killing of occasional calves is admitted—but only on the open range, and open range is nearly a thing of the past. In fenced fields, one female Elk will protect any number of calves from Coyotes or Dogs.

The killing of Deer is admitted—but it is confined to northern California and much of the heavy-timber country where there is a combination of many Deer and all-winter snow.

[53] Coyotes, pp. 12–13.

[54] As above, p. 14.

The killing of Antelope is admitted—but the Antelope are gone now—alas, we fear, gone for ever!

The killing of chickens is admitted—but not when they are properly fenced or housed at night.

These are the summings-up of four judges who have elected themselves to the Supreme Court and sat on the case:

Frank C. Pellett, of Iowa, says: "Coyotes unquestionably do much good in ridding the country of Fieldmice, Rabbits, Spermophiles, Gophers, etc. So while they become a serious menace to the range stockman, it is a question in my mind whether it would be desirable, even though possible, to exterminate them in farming regions like this."[55]

Joseph Dixon, of the University of California, says: "The Coyote would be a detriment in a poultry-raising section, but . . . if we kill off all the Coyotes, we must face the problem of ourselves accounting for the thousands of Ground-squirrels which these animals now annually destroy. In certain instances, Coyotes have actually been afforded protection by ranchers on the ground that they were proving beneficial through the catching of Gophers and other rodents when flooded out during the irrigation of alfalfa fields. *A Coyote is not necessarily a bad citizen.*"[56] "The economic status of the Coyote may therefore be a question of locality, as well as season."[57]

Dr. A. K. Fisher, after full investigation, says: "In parts of the West where fruit growing and farming are dominant industries, it may be wise to encourage Coyotes and Bobcats within certain limits, provided poultry and Sheep are properly protected at night. Numerous ranchman and fruit growers have learned by experience that these animals, if unmolested, will free their premises from Rabbits and other crop or tree destroyers. Where Coyotes and Bobcats have been allowed to do their work thoroughly, they are fully appreciated, and *many ranchers would almost as soon shoot their own Dogs and Cats as* [*these*] *their wild benefactors.*"[58]

Listen to the careful statement of A. W. Anthony, Curator of the San Diego Museum, one of the most experienced naturalists of the West. While disclaiming any special friendship for the creature, he writes in cold logic, "A Defense of the Coyote," which I condense as follows:

"In eastern Oregon, where the Coyote has been hunted by Federal officials for the past several years, the Jackrabbit has grown so abundant

[55] Forest & Stream, Mar. 25, 1911, p. 450.

[56] Control, pp. 382–1.

[57] As above, p. 382.

[58] Yearbook, Dept. Agri., 1908, pp. 188–89. Italics mine. E. T. S.

PLATE LXXII.—YOUNG COYOTES

No. 1.—A litter of pups in the New York Zoological Park, from photograph by Elwin R. Sanborn

No. 2.—Tame Coyote, 3 months old, from photograph by Harold Gibson of Carnduff, Sask.

Nos. 3 & 4.—Young Coyote, 4 months old, Winnipeg, 1905. Photographs by E. T. Seton

No. 5.—Coyotes nearly full grown. Photograph by William A. Bartlett of Nebraska

Courtesy of *Forest and Stream*

that since 1911 it has taken at least 10 per cent. of all the crops suited to its food habits. . . .

"In 1911, I began to take the matter up with the Federal authorities, and was told that an epidemic would soon give us all the relief we could ask for. There were two slight 'waves,' when the Rabbits were somewhat reduced in numbers, but they were back to normal within a year each time. Ground-squirrels were nearly as numerous as the Rabbits, but did not destroy as much because of the fact that they do not work all year.

"As for the damage done by the Coyote, I believe that it is not nearly as great as is claimed, and this seems also to be the opinion of some stockmen. . . . I have several times found, in cases where heavy losses were being claimed, that the Sheep were bedded down in an exposed situation, with the herders and the Dogs sleeping a mile or more away from their charges. This gave the Coyote ample opportunity to help himself. . . . I am convinced that the best check [on Rabbits] is the Coyote, which nature has placed there to keep down just such pests. . . . I have no doubt that *the Coyote is the rancher's best friend*[59] and that many of them so regard it."[60] This conclusion, however, is not accepted by the Biological Survey.

Now for the most sordid consideration of all: The Coyote is a valuable fur-bearer. Its pelt brings from $5 to $20 according to quality. The average price paid in Canada, season 1921–22, was $9.07 per skin. The total value of the Canadian catch was $277,338. In the season 1919–20, the average price was $17.35 per pelt.

Here rests the Government's case for and against the Coyote, for governments are paid to be sordid.

There is yet another consideration—the wonderful value of this noble little brute to sportsmen. It is the giver of more pleasure now to sportsmen, horsemen, and dogmen than any other creature I know of in America.

Lastly, there is the sentimental value—the joy that the naturalist gets in seeing a beautiful, splendid wild thing—a joy that I shall say no more about at present. Yet I must ask: "Do you, with these facts before you, wish to have the Sheep-men carry out their avowed purpose of exterminating the brave and beneficent Coyote?"

## His Troubles

The winter, is, of course, the chief enemy of the Northern Coyote. The shutting off of many food supplies, the severe weather, the exposure to view

[59] Italics mine, E. T. S.

[60] Cal. F. & G., July, 1923, pp. 111–12.

of the hunters, poisoned baits which in summer would be scorned but which are now swallowed in desperation, all unite to make havoc in the numbers, and those that are left by the end of February are the strongest and wariest.

Next after winter, the worst enemy of the Coyote is man; next to this, Dogs; next, disease and parasites; then probably the Gray-wolf, the eagle, and the horned owl.

It is improbable that these birds would attack a grown Coyote, or that the Gray-wolf could catch one, but the very young would fall an easy prey.

The Elk and Deer are to be reckoned in this list. They have a well-founded hatred of all Wolves, and never fail to strike one when they can. One blow from the foot of an Elk or Deer may disable a Coyote and give the hoofed avenger a chance to finish his work.

In the trial for his life, it has been allowed by the courts to be a point in his favour that the Coyote is a scavenger and cleans up the country by devouring all carrion.

There are, however, several disadvantages in this food supply. It affords a certain place for traps and poison to be laid; hundreds of Coyotes and not a few Dogs are thus destroyed every year.

*Mange.* Epidemics of mange have been known among the Coyotes. This malady speedily ruins an animal's coat, which in a Northern winter, of course, means death.

A farmer, Thomas Kerr of Carberry, Man., told me that one winter a Prairie-wolf without any hair on it hid itself under his straw stack, and although driven away by his Dog, it returned and ensconced itself under the granary, where he shot it. It had some disease which had robbed it entirely of its hair, excepting a little patch on the shoulders; it was trembling with the cold, and could not possibly have lived through the winter.

Major Allan Brooks says of the Coyotes that have spread through southern British Columbia, that about 1900 their numbers were greatly reduced "by an epidemic of mange. Many of them were practically denuded of hair, and when such were caught in a trap in anything like cold weather, they would be frozen to death in one night. I have caught them and found them dead in No. 1 traps, staked down solidly for smaller animals, when in this condition; which plainly showed how weak they had become. When in full vigour, I have known a Coyote to break the chain of a Newhouse No. 4.

"Just now the mange seems to be entirely eradicated, but Coyotes are not increasing in numbers, probably owing to the increased Provincial bounty."[61]

[61]Forest & Stream, Nov. 21, 1908, pp. 812–13.

*Deafness.* Those of us who have lived in and long faced the bristling array of spines, spears, pricks, stings, burrs, sharp seeds, yucca jags, climbing spurs, cat claws, nails, spikes, thorns, and devil hooks with which most of the plant life in the great Southwest is so superabundantly garnished, will feel a due and brotherly sympathy with the sufferers whose case is thus discussed by Prof. Loye Holmes Miller of the State Normal School of California.

"In the semi-arid regions of the West," he says, "the struggle for existence is so strenuous that the special senses are very highly perfected. Especially is this true of the sense of hearing, as evidenced by the enlarged external ear in many forms. The Coyote (*Canis ochropus*) is especially marked with this enlarged concha and undoubtedly has, under normal conditions, a very keen sense of hearing. Popular report endows him also with almost supernatural sense of smell. The individual of the species must then labour under a decided handicap if the hearing be destroyed or the sense of smell even slightly impaired. The instance which I cite suggests that such may be often the case.

"In cleaning a pair of skulls of this species, which I obtained in August last, I found in the case of the male that both ears were crowded full of the bearded seeds of the common fox-tail grass (*Hordeum murinum*) which is such a pestiferous weed in the Southwest. The seeds were packed closely into the tympanic chamber and the beards were very much darkened by having remained in the ear some time subjected to the exudations from the inflamed surfaces. In the same individual, a fully bearded seed was found in the left nostril worked well up among the folds of the turbinated bone.

"The second specimen, a female, taken at the same time, had the grass in both ears, but none in the nostrils.

"The ear bones showed no signs of necrosis, though the seeds were in direct contact with them. Hearing was undoubtedly destroyed, and in the case of the male, the sense of smell must have been impaired.

"The animals were taken by strychnine poison with a bait of watermelon, a crop the Coyote injures extensively in the sparsely settled regions. The specimens came to my hands in the meat; they were in good flesh and pelage. There was no possibility of the seeds having gotten into the ears and nose after death.[62]

*Accidents.* All creatures that run swiftly in woods or brush are subject to the accident of "snagging," or impaling, in varying degrees. The following "Woodland Tragedy" is an extreme case: The story was told by J. W. Hulse, of Crevasse, Mont.

[62] Science, Jan. 11, 1907, p. 67.

"While returning from a tramp," he says, "I saw near our cabin, on one of the open mountain slopes, a dead Coyote. Much poison was used this side of Yellowstone Park last winter, and my first thought was that the animal had fallen a victim to it. On reaching the body, my surprise was great to find it had impaled itself on the point of a stick which pierced the heart. The Coyote must have been running down hill, probably chasing a Rabbit, when it struck the stick with great force. The point entered the body in front of and under the right shoulder and penetrated $6\frac{1}{2}$ inches before being stopped by the stump of a lateral branch. The stick was 2 feet long, and about 2 inches in diameter at the larger end. It was freshly broken, and the wood had absorbed blood for about an inch from the body; otherwise there was no sign of blood. The Coyote had been dead long enough to spoil the skin, or I would have had it mounted."[63]

*Rabies.* The Jackal of the Old World is commonly reported to be peculiarly subject to rabies or hydrophobia. The Coyote is the American Jackal, a Jackal on a bigger, more dignified scale, but still of that ilk, and by chance also subject to epidemics of rabies.

According to Prof. J. Shelley Laurman, Director of the state Bacteriological Laboratory, Harney County, Ore., there was an outbreak of rabies in Harney, Crook, and Malheur counties in 1915.

Next year the epidemic had spread to northern California. Energetic efforts were made to stamp it out. The following report is quoted in *California Fish & Game* for July, 1917, pp. 120–21:

"The recent campaign for the extermination of rabid Coyotes in Modoc and Lassen counties waged during 1916 by the Forest Service, the California State Board of Health, the Federal Health Service, and the Biological Survey, resulted in the destruction of 2,707 Coyotes and 178 Wild-cats. In addition, county records show that during the same period, bounties were paid on 1,474 Coyote scalps. Figures compiled by the State Board of Health indicate that 362 head of Cattle, 39 head of Horses, 233 Sheep, and 18 Swine died from rabies during this period. Hundreds of head of stock found dead are also supposed to have died from rabies, but proof was not positive. Laboratory examination of the brains of 127 domestic and wild animals gave positive tests of this disease." [64]

The blind fury of a mad Coyote is illustrated in the *Yearbook*, U. S. Dept. Agri., 1920, p. 294, which shows the head of a Coyote with the mouth crammed and bristling full of Porcupine quills—an attack that apparently ended the Coyote's life.

[63] Recreation, March, 1899, p. 220.

[64] Weekly Bulletin of Forest Service, Feb. 24, 1917.

PLATE LXXIII.—COYOTE FAMILY—NINE PUPS—THIRTEEN MILES FROM DENVER
From a photograph by W. R. McFadden

The following illustrative and lurid adventure with a mad Coyote was recorded by Malcolm Little, of Provo, Utah, and sent me by Mrs. S. Young Gates of the same city:

"The summers of 1891 and 1892 were extremely dry and hot in northern Mexico. A two-years' drought had left the extensive valleys barren. The grass was crisp and bleached, the dust heavy and rose in clouds, and the Casas Grande River was dry save for a few deep, stagnant pools. This being the only water within many miles, all the animals of the immediate vicinity came there to drink. As a result, on each side of the river, for a great distance, hardly a spear of grass could be found.

"The Coyotes were very numerous. They seemed to have been drawn from all the surrounding country to these watering places. So numerous were they, in fact, that in a few hours a man sitting in a tree near one of the pools shot 13 that came to drink. They roamed about in droves of from 8 to 12 in search of food. They were gaunt and hungry-eyed, and their fur was long and shaggy. They appeared to have lost nearly all the sense of fear of man, for they would hardly move out of the way of a horseman. They came into the towns and several were killed in the yards of the dwellings. One, I remember hearing of, walked into the parlour at the front door, and while yet inside was killed with a garden hoe by the lady of the house. These many little encounters, however, were considered as only matters of pleasant gossip, and no one thought of any possible danger coming from them.

"In late June of 1892, 3 men camped for the night midway between the village of Ascension and the Boca Grande, near one of the watering places on the river. They were on the range in search of Cattle, and, as is common with cowboys, after the Horses were hobbled out and supper over, they spread their blankets on the ground. A wide bed was made, and about 9 o'clock they lay down to sleep, Derby Johnson occupying one side and the Jacobson brothers the other two places.

"One of the Jacobsons was anxious about the Horses and did not sleep soundly. In a few hours he was startled from a state of semi-wakefulness by a muffled sound, and seeing Derby sitting up in bed, and thinking something might be wrong with the animals, began to sit up also. As he did so, he saw what appeared to be the tail of a Coyote moving to and fro. He sprang to his feet. The animal with its teeth fastened on the right jaw of his friend, just to the right of the chin, was clinging with the tenacity of madness; while Derby, apparently frozen by awful sensations, sat clasping the Coyote by the neck with both hands, one on each side. It was clear the only way the animal could be removed was by prying open its mouth. The brothers were strong men. Unconscious of the danger to themselves, or

disregarding it, they took hold of the fastened jaws and broke them apart, the lower one being entirely wrenched from its place. They threw the Coyote to one side, but, with its lower jaw dangling downward and with menacing growls, it came towards them again. The young man, Derby, now freed, took his knife from his pocket, cut the animal's throat, and then fainted.

"One of the brothers remained with him while the other went for the Horses. About 11 o'clock that night, they started towards home, a distance of 15 miles. Derby could ride only a few hundred yards without having to stop to rest, and very frequently the journey was stopped by his fainting.

"They reached home early in the morning. Examination showed the Coyote had left a bad wound under his chin, where the teeth had penetrated, while in the upper part were only holes of the canines.

"In a few days the patient was around, apparently well and doing his work.

"After the biting the Coyote was examined, and only dry cottonwood leaves were found in its stomach. From all appearances it had had the rabies.

"About a month after the occurrence, the young man was riding with his companions, gathering Cattle from out of a lake. The water was shallow, hardly knee-deep to the Horses, and the Cattle had gone there to feed on the rushes. All day this work continued, and while splashing through the lake he felt the first symptom of hydrophobia—a strong aversion for water. This feeling later was aggravated by some of his friends offering him their canteens from which to drink.

"He returned home immediately, and for a while was delirious. These spells continued intermittently. He grew worse for two or three days, constantly developing a still stronger dislike for all liquids, and he was able to swallow but very little. Toward the last his ravings became maniacal, and several men were required to hold him. A viscid secretion came from his mouth, the colour of his skin became purple, and his ravings were very loud —the latter, however, had nothing like barking about them, contrary to the common belief in cases of hydrophobia. During the last hour of his life he was quiet, and he died peacefully.

"After this happening, a 'scalp hunt' was gotten up, and 109 Coyotes were killed."

I have never heard of a sane Coyote attacking man.

### Carrion-craze

In the Wolf chapter is a discussion of the doping habit or carrion-craze of the species. The same remarks apply to the Coyote.

Charles Greenwood, of Railroad Creek Lake, Chelan, Wash., writes: "The Coyote rolls in carrion and apparently enjoys the sensation. I have seen one in the act of doing so. He was doping in the entrails of a dead Horse. This Coyote had been feeding on the carcass, but selected the meat on the under side of the loin for its meal, and then rolled its head, neck, shoulders, and breast in the offal, exactly as a Dog will disport itself on the grass after having a bath. What its object was I never could guess, but always supposed the odour was pleasing to the Coyote."[65]

## How to Destroy Him

Coyote-hunting in an automobile is a sport that has been much followed of late in the few parts of the West where still there are wide open spaces.

In view of the fact that the car can go 40 miles an hour indefinitely, and the Coyote only 24 and for a short run, and the Coyote has no defence or means of attack to meet the onset of high-power rifles, the element of fair competition is wholly lacking; that is, it cannot be called "sport." As destruction, it would be more complete if the slaughterer would use aeroplanes for scouting and poisonous gas to "get" the creatures in rough places or any effective hiding.

During my early days in the West, I trapped and poisoned many Coyotes. I studied them so carefully and became so expert that I could get Coyotes with certainty by sundry tricks which played on the creatures' strongest instincts and deep-rooted habits. I have not forgotten those tricks; and Coyote nature has not changed, so that I could go out to-day and gather up Coyotes if I would. But I do not propose to do so, and I intend that my unhallowed information shall die unrecorded. How to destroy him you shall never learn from me!

## The Indian Way of Hunting

It is a real pleasure to enter here the story, "Hunting Coyotes in Death Valley," because it gives us a maximum of huntercraft with a minimum of destruction. It is from the pen of Harry H. Dunn, of Los Angeles, and appeared in *Forest & Stream*, Aug. 3, 1907, p. 172.

He was in camp on the famous California Desert with his halfbreed Indian guide, Bob Lee. The Indian offered to show him some Coyote hunting that night. Away they went in the close of an autumn day; and this is how he tells it:

"In the mesquite thickets of the dried-out beds of desert streams, in occasional caves in the lava buttes which form the mountains of the Cali-

[65] Recreation, Sept., 1897, p. 233.

fornia Desert, and in the willow copses marking the course of every live creak, the Coyotes have their homes and bring forth their young. Rabbits, quail, Rats, Chipmunks, and even the big lizards (chukawallahs) furnish them with an abundant supply of food, and the causes of their increase to the great numbers which now infest the desert are not far to seek.

. . . . . .

"About 5 o'clock, the best and coolest part of the desert day in the late fall, I got out the little carbine and went out to wake the halfbreed. He brought from the rear end of my wagon bow and arrows which he had gotten for me from one of the tribesmen up around Resting Springs. These were Indian weapons, not the painted gauds which are sold for the real thing in the curio stores of the Coast and the East.

"'No use the rifle,' he said. 'Scare 'em all away with one shot.'

"'How far?' I asked.

"'An hour's walk; maybe more,' he answered. And these were practically the only words spoken during the hour's walk.

"This way led first over the rolling sand, then into the sandhills, where of necessity we walked slower. Almost as soon as we passed, the sand fell into our tracks, the slight breeze filling them so rapidly that in 5 minutes our trail was completely obliterated Then we plunged into the hills. . . .

"No water was visible, but Bob said there were pockets in the hill and one considerable tank farther up the canyon to which Coyotes, Foxes, and Wild-cats came to drink. Back from a mesquite clump we lay down in the centre of a circle of stones marking the place where a tepee once stood.

"These rocks were small, and we gathered enough of them, after we had rested and smoked a few minutes, to build up a respectable blind, and in my mind I thanked the aborigine who had carried them from the slope of the near-by hill for his skin home in the long ago.

. . . . . .

"We built the wall high enough so that we could sit or lie comfortably behind it, and carried a few armfuls of brush from the creek bed to scatter around it. By the time we had finished, darkness had begun to gather. Far off across the valley a Coyote howled. In an instant there came, seemingly from the ground at my side, an answering howl. Again the Coyote barked, and the decoy at my side answered him, and when the cry came back out of the shadows, it seemed a bit nearer. Bob turned over on his side and barked twice, short and sharp, unlike the call he had first made. Then, almost before the sounds had left his lips, he lifted up his voice in the long howl which is the family mark of the Coyote tribe throughout the West.

PLATE LXXIV.—COYOTE IN WINTER COAT IN NEW YORK ZOOLOGICAL PARK
From a photograph by Elwin R. Sanborn

PLATE LXXV.—COYOTE DEN. IN THE SANDHILLS, CARBERRY, MANITOBA
From a photograph by E. T. Seton

"This time the call from the hills was nearer, and after two more cries, a shadow slipped across a little moonlit patch. Again the halfbreed called and then lay still, the last echoes of his voice dying in his throat, leaving the impression, even to me, who was near by, that he was at a great distance. Evidently the Coyote was deceived. He stood in the plain light, scarcely 2 rods from the blind. Closer he came, passing us by on one side, evidently suspecting nothing from the pile of stones.

"I started to raise the rifle, but Bob laid his hand on my arm. I saw his left arm straighten out, saw the white of the bow in the moonlight, heard the soft swoosh as the string was released, and then the Wolf leaped into the air and fell back dead."

### Strange Incidents

*Hybrids.* This species readily crosses with the Dog. S. L. Bedson showed me a number of these hybrids at Stony Mountain, Man., in 1885. They were intermediate in character and continued to be inter-fertile with either stock, at least for two or more generations. They were bred in his menagerie and carefully observed.

I never, however, heard of a cross between a Coyote and Gray-wolf, although the Dog is as readily crossed with the latter as with the former relative.

Another hybrid was reported to me by A. G. Dunnet, of Virden, Man. On Aug. 6, 1912, he wrote me as follows: "I have in my possession a female hybrid sired by a mongrel Dog and out of a bitch Prairie-wolf. It is black in colour with only a little white on its breast. It shows practically no trace of the Dog, but is in appearance very much like a black Fox. I got it a puppy, and have had it over one year now. . . .

"The animal which I have is an authentic specimen. I saw it as a puppy when it was suckling the mother, a Prairie-wolf, and I can furnish complete details re its parentage."

A much more picturesque and puzzling case comes recently from Westchester County, N. Y., under the caption: "Wolf, Fox, or Dog?"

"During the spring of 1919, Mr. Edward G. Faile, of Rosedale, Westchester County, N. Y., began losing his poultry in such an alarming quantity that immediate action became imperative. The thief was at first thought to be a Fox, as the roosts were only visited at night, and it was impossible to get a good look at the varmint who successfully avoided all traps set for his capture. Later it was decided that it could not be a Fox, as chickens were taken from roosts too high for the largest Fox.

"Several times the animal, or animals (as there were 2 of them working

together) were sighted by Mr. Faile and members of his family, but due to the poor light, the Fox theory again gained favour, as the animals had the appearance of Foxes except for their size. One evening, just at dusk, Mr. Faile was lucky enough to secure a fair shot as one of the animals was approaching the henhouse. It was apparent that the rifle ball had found its mark, but when the farm Dogs closed in on the chicken thief, they were badly cut up, and the animal would probably have escaped had it not been for a timely charge from a shotgun which ended the argument.

"The hide was sent to a prominent New York taxidermist who reported to Mr. Faile that he could not identify it. The writer, when told of the incident, made a trip to Mr. Faile's home, feeling confident that he would find the common Western Coyote. Instead, he found the skin of an animal different from anything he had ever seen before. The brush, size, and head were Coyote. The body colour was that of the common Red-fox. The ears were too short for a Coyote, and the fur was much too fine in texture.

"Realizing that a hybrid had been taken, the skin and skull were brought to New York City and authorities consulted in an effort to find out exactly its origin. When the skin was first shown to Dr. Roy Chapman Andrews and Dr. Harold E. Anthony, Associate Curators of Mammals, American Museum of Natural History, they decided that the animal was a Coyote with a distinct Dog cross. However, examination of the skull and comparison with the skulls of Dogs and Coyotes made them modify their opinion, and the final decision was that this animal was a second or third Dog-Coyote cross. The only Coyote characteristic found in the skull was the length of the nasal region. The skull was too broad, and the brain cavity, while not swollen to the extent found in the domestic Dog, was too large for that of a Coyote. The Prairie-wolf has no depression or stop in front of the eyes as is found in all Dogs, and in this respect the skull again showed the Dog characteristics.

"Doctor Andrews offered the following as a possible solution of the taking of this animal in a section where Coyotes have not before been found in the wild. Possibly someone had a Dog-Coyote in captivity which crossed with a collie, common shepherd, or possibly a police Dog. The pups may have all failed to show any of the Wolf characteristics, as is often true of the first cross. However, on the second or third cross the throwback to the original strain became very pronounced, with the result that this animal was almost a true Coyote type in appearance and had the characteristics of the Wolf."[66]

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[66] Field & Stream, Aug., 1920, p. 401.

### Some Remarkable Coyotes

In 1904, A. S. Barton related to me a curious instance of a crippled Coyote that had lived for the previous 2 years near Boissevain, Man. It was known as the "Three-legged Terror." One of its front legs was missing (probably it was lost in a trap), but in spite of this, the creature could outrun an ordinary Dog. Greyhounds or very fast Dogs easily outstripped it, whereupon it found a place to protect its rear and presented such a desperate front that it had hitherto escaped.

I suspect that this was a female, which might partly have accounted for its immunity.

Another case of the kind was recorded by Enos A. Mills. "Near Canyon City, Colo.," he says, "an apple-grower showed me a 3-legged Coyote that used his orchard. The Coyote had been about for 4 or 5 years and was quite tame. He was fed on scraps and was wise enough to stay in the small zone of safety round the house."[67]

Some sad accident it was no doubt that robbed these wild freebooters of the leg. We have no way of learning what it was because they escaped.

### A Strange Friendship

In the Badger chapter will be found several cases of pleasant friendships between Coyotes and Badgers. There have been many in which the Coyote made a brotherly alliance with a Dog. But the only one that I know recording a Cougar and Coyote combination is the following from Enos A. Mills's book:

"On one occasion, when I was on a cliff at the edge of a grassy opening, I was astonished to see a Coyote trot leisurely across, and just before he disappeared in the woods a Lion appear on the opposite side of the opening, following contentedly along the trail of the Coyote. The next day I again saw this friendly pair, but on this occasion the Lion was leading and the Coyote following. Afterward I saw their tracks a number of times.

"Just why they were associated in this friendly manner we can only conjecture. It will be readily seen that the Coyote, which has all the wisdom of a Fox, might follow a game-hog Lion about, and thus, with little effort, get a substantial and satisfactory food supply. But why the Lion should willingly associate with a Coyote is not quite clear. Perhaps this association proved to be of some advantage to the Lion in his killing, or it may have been just one of those peculiar, unaccounted-for attachments occasionally seen between animals."[68]

[67] Watched, p. 95.

[68] As above, pp. 203–04.

## The Wise Little Wolf

The Prairie-wolf is mentally a compound of Fox and Wolf. While gifted with a good deal of cunning that is shown in its avoidance of traps and its method of taking its prey, it is also a desperate fighter when at all evenly matched.

I have more than once seen a Coyote run across an open stretch of black ploughed land, then on a piece of dry yellow grass sink into concealment. It matched it perfectly in colour, but was probably actuated by the idea that it was cover.

The Coyote is less shy and cunning than the Gray-wolf. I find the following characteristic note in my New Mexico Journal:

"Clayton, Dec. 14, 1893. This morning I found that a small Gray-wolf had run my drag till he came to the first trap; there he had turned aside, passing three cheese baits. A second very large G ray-wolf had struck the drag just before the second traps. He had passed them unhurt, then had come to a cheese bait, urinated on it, and had then left the drag altogether. A Coyote that was following him on the chance of pickings, came on the bait and was kept from it by the treatment the Wolf had given it, but went on a mile and a half, picked up a poisoned cheese bait, and then half a mile farther got caught in the next trap, where I found him stark and dead."

That the Wonder Dog is equipped with a sixth sense that tells him when a man is armed, every hunter in the West is fully convinced. The following incident is one of many that could be cited in proof.

One evening of October, 1882, on the Big Plain, Manitoba, my neighbour, G. M. Wright, came over to ask for the loan of a "gun or something." He said that for a week past, a big Coyote had been living on them, eating out of the swill pail, lying asleep on the door mat, playing with the Dog, killing an odd chicken, and sometimes scaring the children by standing up on his hind-legs to look into the window.

When the men were around, he moved off to safe distance from stone's throw, but seemed to think he owned the place, and knew perfectly well that there were no guns at hand.

I went at once with the rifle. It was 9 o'clock at night when I arrived. I was up at dawn and on guard in a window. I saw the Coyote a quarter of a mile away, watching from some scrub, and never after did he come within range.

At the same place on March 18, 1883, I had another experience that shows somewhat the mind of the Prairie-wolf.

About 9 A.M., I was leaving the barnyard with team and sleigh to get a

PLATE LXXVI.—COYOTE IN SUMMER COAT
Life study by E. T. Seton, September, 1886

load of wood. As I rounded the stable, I came into full view of a dead calf that was lying on the open prairie 75 yards away. A Wolf was tearing at the calf; he saw me plainly but went on with his eating. Of course I had no gun; I knew that if I stopped now to get a gun the Wolf would run. So I kept straight on. I passed within 30 yards of him; he watched me but kept on eating. After I was 300 yards away, I turned back by another road, intending to go cautiously to the house and get the gun, but the moment I left the beaten road, that watchful Wolf seemed to divine my purpose and ran as though already the lead were flying after him.

I have had similar experiences a dozen times since, and Grinnell makes an observation in line thus: "These Coyotes are as impudent and unconcerned as possible when you don't happen to have a gun with you. Last autumn I saw them lie down within 30 or 40 steps of me just to wait till I had passed by, and, as I said, at night they come up all around the house."[69]

A parallel incident is narrated by Dr. W. T. Hornaday: "The delicacy of the Coyote's judgment in keeping always beyond fair gun-shots is truly wonderful. If he is not a mind-reader, his actions belie him. Twice in Montana, each time for 2 weeks, have I tried my utmost to shoot a Coyote; but during those periods not one would offer more than a running shot at 300 yards or more. Twice, however—and immediately after the above—when riding quite unarmed, have Coyotes sat down beside the trail, waited for me to approach within 40 yards, then yawned in a bored manner, and slowly trotted off. It is my belief that those animals knew perfectly well my inability to shoot."[70]

This is an incident of a kind that has led many to credit this animal (and others) with the power of telepathy. Before accepting such an explanation we must have many cognate instances recorded by trained observers, and also have a fuller knowledge of the animal's sense-capacity in an ordinary way.

Dr. G. B. Grinnell writes:

"The wisdom of the Coyote is proverbial. An example of this happened not long ago on the ranch. We have a yellow sheep Dog, named Shep, who very much delights in chasing Coyotes, Jackrabbits, or Antelope. He never catches any of these creatures, but he always chases them, and after he has run himself down, comes back with lolling tongue and mortified air. The Coyotes often come up within 150 or 200 yards of the house during the day, and whenever the Dog sees them he chases them out of sight. If they do not take the trouble to run fast for him, he overtakes them and there is a

[69] Forest & Stream, Dec. 26, 1896, p. 511.

[70] Amer. Nat. Hist., 1904, p. 24.

fight. At night the Coyotes come immediately up to the door, and can be heard all about the house and buildings, and at this time the Dog is kept busy chasing them.

"Not very long ago, the Coyotes appeared to have made up their minds that they wanted to get rid of this Dog. About 9 o'clock at night one of them came to the kitchen door and howled. The Dog rushed out after him and the Coyote ran away, looking over his shoulder. He ran down toward one of the corrals and around behind the blacksmith's shop into the garden, and the Dog followed him at the top of his speed. Behind the blacksmith's shop and waiting for the Dog were 6 or 7 other Coyotes, who at once pitched into the pursuer and proceeded to worry him.

"The noise of the fight led Billy C. to seize his gun and rush out there, and he saw this snarling, writhing mass of animals on the ground. He could not shoot for fear of killing the Dog but at his yells the Coyotes scattered and disappeared. He was only just in time to save Shep, who was badly cut up. Since that time Shep's interest in Coyotes has somewhat lessened. He will chase a single one with his old vigour, but if a second appears, he returns to the house."[71]

Mary Austin gives an admirable picture of a prowling Coyote in her "Land of Little Rain" (1904, pp. 30–31): "Watch a Coyote come out of his lair," she says, "and cast about in his mind where he will go for his daily killing. You cannot very well tell what decides him, but very easily that he has decided. He trots or breaks into short gallops, with very perceptible pauses to look up and about at land-marks, alters his tack a little, looking forward and back to steer his proper course.

"I am persuaded that the Coyotes in my valley, which is narrow and beset with steep sharp hills, in long passages, steer by the pinnacles of the skyline, going with head cocked to one side to keep to the left or the right of such and such a promontory.

"I have trailed a Coyote often, going across country, perhaps to where some slant-winged scavenger hanging in the air signalled prospect of a dinner, and found his track such as a man, a very intelligent man accustomed to hill country, and a little cautious, would make to the same point. Here a detour to avoid a stretch of too little cover, there a pause on the rim of a gully to pick the better way—and it is usually the best way—and making his point with the greatest economy of effort."

"The Coyote constantly uses his wits," says Enos A. Mills. "In a Utah desert I often saw him watching the flights of buzzards. If the buz-

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[71] Forest & Stream, Dec. 26, 1896, p. 511.

zards came down, the Coyote made haste to be among those at the feast. In returning from a far-off expedition on plain or desert, he seems to be guided by landmarks; appears to recognize striking objects seen before and to use them as guideposts."[72]

An interesting account of the "Coyote as a Strategist" is given by A. Meacham, of Washington. He says after sundry illustrations: "But the best specimen of the cunning of the Coyote is illustrated by the way in which it captures young Pigs from their mother. In this kind of a chase 2 Coyotes combine their efforts. One of the two attracts the attention of the sow, bites at it, and fights it and leads it away from the young Pigs. The other Coyote then snatches up the Pig and away it goes with its little porker. This instance is well authenticated, and has happened more than once in districts where hog-raising is common. Can any of your readers furnish a better instance of cunning or strategy on the part of any wild animal? Should it not be conceded that the Coyote is a close observer and even a pretty close reasoner? Is it not entitled to some respect for its cunning as a hunter?"[73]

### His Courage

Most books of Western sport describe the Coyote as cowardly, etc., because it does not elect to walk up openly to a pack of huge Dogs that are backed by irresistible forces in overwhelming numbers.

Is there a man on earth who has a 25-pound Dog and is willing to match that Dog fairly against a 25-pound Coyote?

Is there a man on earth who, armed only with nature's weapons, and single-handed, is willing to enter a tight enclosure and try grips to a finish with one little Coyote?

I trow not. Neither Dog nor man has valour enough to meet the Coyote on equal terms. Therefore, ye dog-men, refrain for ever from calling the Coyote a coward, for it makes it appear that much worse for you and your Dog.

It takes a wonderfully valiant Dog to kill a Coyote. Yet I knew a collie, "Old Frank," the property of my neighbour, John Thompson, of Carberry, Man., that had several times run down and singlehanded killed Coyotes. I saw him actually perform this feat in the November of 1882. The Wolf faced him again and again, but he managed each time to escape serious injury from its jaws, and when the Wolf turned to fly he would snap at its rear. On skinning the Wolf, I found that the Dog's teeth had sunk

[72] Watched, p. 94.

[73] Forest & Stream, Jan. 17, 1903, p. 48.

deep into the Wolf's flesh each time, so that its hind-legs were disabled. This Wolf, however, died gamely fighting, though the Dog was three times his weight and was backed by men with guns.

In my early days I caught a great many Wolves in traps—many scores, if not hundreds—and I found great diversity of behaviour among them at this trying time. Some were utterly cowed and submitted to the death penalty in sullen silence; others struggled to escape; some yelled defiance; and not a few barked and growled savagely, trying to reach me, raging and defiant to the end.

The following incident which looked like a "show-down" between a Coyote and a Bobcat (or maybe two, each of which was probably his own weight), proves very clearly that the Coyote in his native range is not afraid to stand valiantly for his rights. The incident was witnessed by one of the Biological Survey hunters whose district is near Gardner, Colo. He writes:

"To-day (Dec. 26, 1923), while riding from the Dietz ranch to the head of Cottonwood Creek to follow a poison line down the Creek and back to the ranch, about 6 miles from camp I was attracted by a barking noise that sounded like a Dog going into a hard fight. In some tall timber which had a thick undergrowth, I was led by the noise. At this point I got a glimpse of a large Coyote and large Bobcat having a real battle. I could not shoot either of the animals from the Horse I was riding, as it was very scary. I dismounted, all the time watching the fight, and then I tied the lines of the bridle to the foreleg of the Horse.

"The Bobcat and Coyote discovered me by this time, and as they ran, I fired and shot at the Bobcat through the thick timber, but did not stop it. In a nearby tree, I noticed another Bobcat which was not taking any part in the fight, but evidently was looking on; I succeeded in shooting this Cat, killing it.

"From all I saw, the Coyote seemed to be pushing the fight, but the Cat refused to take a tree. The snow was gone from this particular ground where the fight occurred, and was only to be found in patches. I could tell from the snow that the Coyote and Bobcat had moved some as they fought.

"This particular Coyote had the nerve to take hold of this very large Bobcat four or five different times. I could see from the sign that the fight had been on for some little time. At one place in the snow, the Bobcat showed full print of his body stretched out on its side, and looked as if the Coyote had thrown him from the way they had torn up the snow. There was plenty of fur from both the Bobcat and Coyote to be plainly seen."

PLATE LXXVII.—COYOTES IN NEW YORK ZOOLOGICAL PARK
Photographs by E. T. Seton

### A Social Scrap

In Aug., 1886, I saw 2 female Coyotes fight in a cage. They snapped chiefly at each other's necks. The victor, however, disabled and subdued the other by a serious bite in the fore-leg, then amused herself by growling and urinating elaborately over the fallen foe—a treatment to which the vanquished submitted with every appearance of abject fear.

This disposition to spurn and insult a conquered enemy seems peculiar to the Dogs. Nothing of the kind is observable in the Cats. When a Cat's enemy flies, the victor is done with him, but in a Dog, flight of the foe is the strongest incentive to pursue for a time at least and cover himself with glory.

### A Rogue and His Practical Jokes

There was a time when men claimed that man alone had a sense of humour, that man alone had invented play-games.

It seems safe to say that every animal treated in this work plays at games, and therefore, to some extent, has a sense of humour. None of them excels the Coyote in this last particular.

Many times have I known a Coyote tempt a Dog to chase him, then at a safe distance from the Dog's human helpers turn on him and drive him back with noisy demonstrations that looked like a wild, hilarious jest. Every ranchman and camper in the West can tell some similar experience.

Another practical joke that thousands of Coyotes have played is to cut the picket ropes of a Horse, and so turn the animal loose and set the hunters afoot.

G. B. Grinnell writes of Coyotes in a new frolic: "Last winter Billy reported to me that he saw two of them on a big piece of ice bothering a big Wolf. The ice was slippery and they could get started and could turn much more quickly than their larger cousin. One of them would go in front of him and annoy him while the other ran past him from behind and nipped him as it went by. Then the big Wolf would try to turn and chase the little one, but he would slip, and before he fairly got started, would get a nip from the other. So they worried this old fellow for quite a little while, and were still at it when Billy went out of sight."[74]

Again, on the same page, he tells of a game, possibly friendly, between a Coyote and a Badger: "A few weeks ago, while riding out to look at a bunch of Cattle, I saw as I rode, going over a little hill near the house, a Coyote down in the next valley, and with the Coyote was a Badger. I had no gun, and the Coyote seemed to know it, for he paid no attention to me, but ap-

[74] Forest & Stream, Dec. 26, 1896, p. 512.

peared to be playing with the Badger. He would prance around it, make a feint of biting it, and then run off a little way, the Badger immediately running after him. This he did until the Badger had gone 60 or 70 yards, when I got so near the two that the Badger saw me and ran into a hole, and the Coyote trotted off 40 or 50 yards and lay down. I did not comprehend just what was going on, but it was evident either that the two animals were playing together, or else that the Wolf was teasing the Badger."

Enos A. Mills was well aware of the Coyote's love of play. He describes at length a rough merry-making that a Coyote had with a Blackbear cub. This appears in the "Blackbear Life" Vol. II.

But recognizing the Coyote's wonderful gift of song, Mills says: "The characteristic play of the Coyotes is noisy. They have concerts full of howls, barks, and yelps, in ever-varying combinations. These players have regular places for assembling, and both singly and collectively send their wild notes flying at different angles off into the night. There are weird, ventriloquial effects which sometimes multiply and reproduce one yapping, yelping entertainer into a scattered number. At other times the howler so transfers his voice that it seems to issue from a point widely separated from the owner. But sometimes this clown of the prairie forgets singing to the stars, and in silence has games and contests which require speed and skill."[75]

## The Kindly Coyote

E. Roy Connelly, of Regina, Sask., sends me on Aug. 17, 1913, an enlightening account of his pet Coyote. It brings out the bright friendliness of the Coyote. I gladly reproduce his letter:

"I have a Prairie-wolf or Coyote cub about 4 months old, which is quite a pet. I have had it for nearly 3 months, and recently let it run loose most of the time, as it won't go far away. Last night it was loose but turned up for breakfast this morning. He will answer my whistle like a Dog and will also run after a stick and bring it back to me. I give him a bath every little while, and he enjoys it after he begins to dry. I have often had more trouble in bathing a Dog. When I first got him, I fed him principally on bread and milk with a little cooked meat and fish. Then I was away for a month, and the boys, of whom there were 10, at the house fed him a good deal of cooked meat, and now he thinks he should have that all the time, but likes eggs, candies, and many other things. I find him very intelligent, and at times affectionate. He is very playful and shows no fear of a Dog; in fact, he goes right up and wants to play. A fox-terrier comes around at times

[75] Advent. Nat. Guide, p. 206.

and they have a great time together. I bring him in the house sometimes, and he goes after the rugs and cushions pretty hard."

But the brightest light, the most suggestive statement I can find, that bears on the spirit of this brave and kindly creature, is in the following by Enos A. Mills: "I have also seen one or more Coyotes stay near a crippled Coyote as though taking care of him, and endeavour to lure away any hunter who approached."[76]

### A Sociable Little Beast

The species is but slightly gregarious. The most I have ever seen in one day was 8, and the most at one spot was 3. They were gathered at a dead calf and scattered immediately after their feast. Three is the most I ever saw travelling in company. The most I have heard of together was 12, also attracted by a carcass. W. R. Hine tells me that he has seen 5 together, never more; these were at a dead animal; and the most he ever met with in one day was a dozen during a 60-mile drive along Red River, Man., in the autumn.

Six Coyotes, *i. e.*, 3 pairs, were seen by Lew Wilmot as they were chasing, a Deer in the spring of the year at Oroville, Wash.[77]

Eight Coyotes were seen together in August by Henry W. Wende, of Sunnyside, Wash. They were near a drinking place in the Yakima Valley and may have been a family, but they looked fully grown.

A dozen are the most in one band that I can learn of. These were seen and heard near Humboldt by Professor John Macoun on Oct. 15, during his journey from Fort Carleton to Winnipeg in 1875. Early one morning, as he sat by the fire after his wagon had gone, they gathered about him, and sitting on their haunches some 75 yards off, all howled their loudest.

As will be shown later, the Coyotes frequently combine their efforts for the common good, although they do not habitually go or live in bands. I should therefore say the species was sociable though but slightly gregarious.

The cases recorded by Lew Wilmot are full of observations that reflect light on the Coyote as well as on the hunters. They are dated Oroville, Wash., March 22, 1897, and appeared in *Forest & Stream* for April 10, 1897, p. 284, as follows:

"A few years ago along in the spring I took my rifle and started up into the open hills to kill some grouse, and when I got up on to the top of a small ridge that puts down between my creek and the Columbia River, I stood still for a while listening for a grouse to hoot.

[76] Watched, pp. 85–6.

[77] Forest & Stream, April 10, 1897, p. 284.

Plate LXXVIII. Coyote Studies by E. T. Seton.

"Across from where I stood was quite a high mountain, covered with bunch grass and a few scattering pines; the snow had not all gone, especially near the top. I had not stopped very long when I saw a Deer coming over the hill, and from the way it was coming, I knew there was something after it. Soon I saw 2 Coyotes down to the right, and the way they were running I thought they were trying to head the Deer off from the river. Soon I saw 2 more on the trail, and then I saw 2 more to the left [3 pairs undoubtedly], and it looked to me as if those that were on the flanks were running the fastest. There was a crossing in a gap in the ridge I was on, and I knew the Deer would come through that gap; so I ran down toward the gap; not that I wanted to shoot the Deer, but I wanted to shoot at the Coyotes that were on the Deer's track.

"I had not got quite down to the gap when the Deer came through. It was a Whitetail buck, and he was doing his best to get to the river. I had but a short time to wait when the 2 Coyotes came along. I whistled when they got opposite to me, and they stopped and looked up. I fired at the one that looked the largest. At the crack of the rifle it started and ran as fast as it could for about 50 yards and rolled over dead. The other followed it for a few yards and then turned off up the hill, and when it saw its mate roll over it stopped. I shot at it, and as I did not make the right allowance for distance, undershot and broke one of its legs. I put my Dog after it and he soon brought it to bay, and I had the satisfaction of killing it." Here we have what was almost certainly 3 mated pairs, for it was March, uniting to tackle a prey too strong for any 2 Coyotes.

What looks like a sociable gathering to enjoy much smaller game, is set forth by the same old-timer, thus:

"On another occasion I was coming down from a neighbour's, and when near the bottom on the Columbia, I noticed a couple of Coyotes hunting through the grass and low bushes; they had their tails up like a Dog, and seemed to be as busy.

"Soon they were joined by 2 more and all had their tails up, and as they had not discovered me, I waited to see what they were after. I never saw Dogs hunt through a flat more diligently than they did, and it looked so amusing to see them with their tails up. I think they were hunting Chipmunks. Not having anything to shoot with, I started on, and when they saw me they trotted off up the gulch, but lowered their tails, Coyote-like.

"I have often been told by white men and by Indians that they had seen as many as 15 after one Deer. This winter while on a trip to Curlew, I had to go down on Kettle River, and I saw where 6 Deer had been caught by Coyotes. I examined to see whether any big Wolves had been among

them, but did not see a track. An old Indian told me that a few days before, the Coyotes had run a Deer down on to the ice and caught it, and he heard it bleat and he ran down, but when he got there they had almost eaten it up."[78]

Intercommunication of ideas is well developed among Coyotes, which may be claimed as a proof of sociability. The smell-telephone with the smelling posts is largely used, as described in the Wolf chapter; but they also communicate many ideas by example.

Their remarkable vocal powers are at least as important as any. The principal sounds they utter are described in another paragraph.

### The Wild Song in the Dark

The voice of the Coyote is one of its most remarkable gifts.

Barking is supposed to be limited to the Dog and the Coyote. This is not strictly true, for Wolves, Foxes, and Jackals bark at times, but it is true that the Coyote is the only wild animal of the family that habitually barks.

We must assume, as general propositions, that nothing in nature is without adequate cause, and that it is always worth while to search that out. Most of the many calls of the Coyote are signals to its companions, but some of them seem to be the outcome of the pleasure it finds in its own music.

The most peculiar of its noises is the evening song, uttered soon after sunset, close to camp at times. This is a series of short barks, increasing in power and pitch till it changes into a long squall. One Coyote begins, and immediately two or more join in, making so much noise that newcomers think there must be a hundred Wolves out there. It is kept up for perhaps a minute or two, then ceases till some new impulse seizes them. Aug. 27, 1904, in W. F. White's menagerie at Winnipeg, I saw a Coyote pup, which, though little bigger than a House-cat and less than 3 months old, had a fully developed voice, and, much to the amusement of numerous bystanders, joined in the yapping chorus as lustily as his grown-up relatives. I think that both sexes sing.

I never heard the chorus among wild Coyotes while the sun was above the horizon. In the evening, it comes first with the gloaming, and in the morning is unknown after dawn.

In captivity, it is often enough heard by day. A favourite time is at noon, when the blowing of whistles seems to be the immediate cause, or possibly only the last touch that precipitates the event.

[78] Forest & Stream, April 10, 1897, p. 284.

Another note I have heard them utter toward dawn is a long, smooth sound, of truly musical quality. I have sometimes mistaken it for the fluty call of a loon to his mate.

I once knew a Coyote that would stand around the ranch till the small Dog went valiantly after it. The Coyote would run till at a distance that made it safe from guns, then turn on the Dog and drive him back ignominiously to the shelter of the house. Of course, the Dog soon learned that the enemy was not so "easy" as he looked. On each occasion when the Coyote turned, he uttered a series of gurgling, growling barks, that seemed to strike terror into the Dog and were to me an entirely new Coyote "song."

The sound the old one utters when the young are in danger, is described as a prolonged, quavering yelp or squall rising in pitch towards the end.

In their vespers A. S. Barton notes an interesting habit. Two or three Coyotes will meet each night on a certain elevated place to sing. They have several of these recognized choir-lofts, but they never use the same on two nights in succession. Sometimes at Turtle Mountain, on dead calm moonlit nights, each Coyote mounts his singing perch and pours out his wild free soul in a prolonged outburst of his loudest and finest notes. This is passed on from one to another, till the whole mountain seems ringing with the stirring music, and, from its very weirdness and the vast stretch of the country that is concerned, the effect is truly impressive.

Enos A. Mills is one of those sympathetic students of the wilds who have lived the Coyote life and learned to rejoice in it. His description of the Song-dog's music and magic power will surely voice the unspoken thrills and understanding of many a lover of the West.

"The Coyote," he says, "uses his voice for other things than pleasure. He has a dialect with which he signals his fellows; he warns them of danger and tells of opportunities; he asks for information and calls for assistance. He is constantly saving himself from danger or securing his needed food by coöperating with his fellows. These united efforts are largely possible through his ability to express the situation with voice and tongue."[79]

"Through repetition, a Coyote's signals are ofttimes relayed for miles. A leader mounts a lonely butte and proclaims his orders over the silent prairie. This proclamation is answered by repeating Coyotes a mile or more away. Farther away, at all points of the compass, it is repeated by others. And so, within a fraction of a minute, most of the Coyotes within a radius of miles have the latest news or the latest orders.

"Sometimes the stratum of air above the prairie is a mellow sounding

[79] Watched, p. 96.

board; it clearly and unresistingly transmits these wild wireless calls far across the ravines and hills of the prairie. The clear notes of a single Coyote often ring distinctly across a radius of 2 or 3 miles. When groups congregate in valley concerts, all the air between the near and the far-off hills vibrates with the wild, varying melody. This may reach a climax in a roar like the wind, then break up into a many-voiced yelping.

"I love to hear the shoutings and the far-off cries of the Coyote. These elemental notes are those of pure gladness and wildness."[80]

### The Spirit of the West

O Wonder Dog of the West! O Song-dog of the Dawning! more than any other creature, the symbol of the medicine-making West! How I wish I could do justice to your spirit, to your meaning, to your way of life! If I could only voice the fierce, sad joy that you engender in me!

In memory's eye, I see you as I used to see, perched on some upper perch, where, spread a little lower, was the Prairie-dog town, the teeming village of your vassals that owed you a living. I see you as I used to see, exchange a swift, yellow-eyed blink with the Wonder-she near by, your partner, your loved one. I see that comprehending, informational arrangeative blink of the eye. I see her crouch as you stalk openly forward, down and on, to the dog-town with its yapping, contemptible fat ones—stalk on alone, as though alone. And the chattering Prairie-dogs dodge down. Then, with a swift onset, your partner rushes out and hides behind some grease-wood bush that the Wistonwish left for reasons of his own.

Onward you march alone, and the chattering pot-bellies stick out their heads, seeing you, seeing you far away, and knowing nothing of the keen-eyed partner, sandy yellow on the yellow sand behind the grease bush. Now the Yappers grow bold and one ventures to seek for the food farther off. Then with a rush, the sandy yellow furry one is on him, chops him, and you come back to share the feast with your dear one.

Not much it takes to keep you happy, for you are in love, O Coyote! And also you have everything—food and health and strength, good hunting, and love. You could not be other than happy.

You sleep near each other under the shady yuccas. The red sun goes down, the cool of the evening is on the vast campagna that shimmered in the low-noon heat.

You are roused from sleep; you are impelled by the life-forces in and out of you to be up and doing. Your spirit is stirred, is uplifted, so not mere action can express your thrill, your exaltation; and like the prophets

[80] Watched, pp. 96–97.

PLATE LXXIX.—THE RELAY CHASE

To illustrate the Coyote's manner of combining drive and ambush with relay chasing, without which they could not capture the swifter Antelope

and saga-singers, you voice your spirit's thrill in a song, a shouting, that is the very same in nature with the love-mad song of the nightingale, only louder, stronger, farther-reaching, as becomes the nobler, singing thing that you are.

Every plainsman in the West has heard and learned to love your song, and every dweller in the West that is to be will know it well, for still it sounds from the level buttes in the early dark.

Sheep-men may rage and governments set a blood-price on your head, —but wise are you as you are swift and brave.

From all parts of the West comes the same rejoiceful news—the Coyote holds his own and is even winning wider lands, and defies the cleverest machinations of the all-destroying Whiteman. How complete was the Redman's understanding when he called you the " Wonder Dog," and made you the incarnation of the Deity, the one who brought the divine fire to earth in the beginning, the one who will live to see it die when all the world is dead.

If ever the day should come when one may camp in the West, and hear not a note of the Coyote's joyous stirring evening song, I hope that I shall long before have passed away, gone over the Great Divide, where there are neither barbwire fences, nor tin cans, nor hooch-houses, nor improvement companies, nor sheep-herds, nor flies, but where there is peace, and the Coyote sings and is unafraid.

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## LIFE X—THE DESERT COYOTE


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## Desert Coyote, Arizona Coyote, Mearns Coyote, Dry Coyote, Little Coyote

*Canis mearnsi* Merriam

(L. *mearnsi* in honour of Dr. E. A. Mearns who discovered it)

*Canis mearnsi* Merriam, 1897, Proc. Biol. Soc., Washington, II, p. 30, March 15.

Type Locality—Quitobaquita, Pima County, Ariz.

It is not easy to distinguish the Desert Coyote from the Coyote of the Plains. Merriam's characterization of it is as follows: "Size small; ears medium; colouration rich and bright, the fulvous tints exceedingly bright and covering the whole of the fore and hind legs and feet. Skull and teeth small."[1]

Thus the small size and bright colours are the strong features, but I have found specimens that showed all grades between a *latrans* colour and *mearnsi* colour. And, as will appear later, there is but slight difference in size. There can be little doubt that, in a broad sense at least, there is only one Coyote over-species. And as such I shall treat it for the purposes of life-history.

Nevertheless, the Desert Coyote has some peculiar habits born of the desert; therefore I give a brief sketch of its life on the sands.

*Size.* Total length of a ♀ , 43½ in. (1104 mm.); tail, 13 in. (330 mm.); hind-foot, 7⅛ in. (180 mm.). These dimensions, though not maximum, it will be noted, can be closely matched in *latrans*.

*Weight* of adult ♀ from Trumbull Mountains, Ariz., 25 lbs.

*Colour.* "Muzzle cinnamon rufous; space between the eyes grizzled grayish and fulvous; top of head, nape, and ears rather light fulvous; rest of upper parts buffy-ochraceous bountifully mixed with black-tipped hairs (under-fur bright buffy-ochraceous [*i. e.*, their tips]); under-parts in pectoral and inguinal regions whitish, middle part of belly suffused all the way across with buffy-ochraceous; throat buffy, the long hairs black-tipped; fore- and hind-legs and feet bright orange fulvous all round; upper side of fore-legs

[1] Revision of the Coyotes or Prairie Wolves, with Descriptions of New Forms, by C. H. Merriam, Proc. Biol. Soc., Wash., XI, Mar. 15, 1897, pp. 30–31.

moderately mixed with black; under side of tail pale fulvous, whitish at very base, hairs of distal half black-tipped; extreme end of tail black, usually with a few white hairs.

"*Cranial and dental characters*—Skull and teeth small and light as in *C. estor;* a little larger than in *C. microdon* from Mier, Tamaulipas.

"*Remarks—Canis mearnsi* is the handsomest of the Coyotes. It differs from *C. microdon* of the Lower Rio Grande region in slightly larger size and in the greater extent and much brighter tints of the fulvous parts. The fore- and hind-legs and feet are bright orange-fulvous all round; in *C. microdon* the fulvous is deeper and duller and the white of the inguinal region reaches down on the inner side of the hind-leg to the ankle and covers the upper surface of the foot, and in the fore-leg a white stripe reaches all the way down the posterior aspect of the leg to the wrist. Compared with *microdon*, the throat and middle part of the belly are more ochraceous and have fewer black-tipped hairs—the belly practically none. The skull and teeth of *mearnsi* are almost exactly like those of *estor*, but in colouration the two animals differ so widely as to require no comparison. Nevertheless, specimens collected by Doctor Mearns at Tinajas Altas, Ariz., are so much paler than typical *mearnsi* as to suggest intergradation."[2]

## Range

Though accredited only to a limited area that includes a small part of Southern Arizona, the southwestern point of New Mexico, and Sonora, there can be no doubt that it covers a somewhat greater territory and that it intergrades into the other desert forms, which are found throughout the extremely arid country of the Southwest, mainly within the Lower Sonoran Fauna. This is one of the hottest and most arid regions of the continent, yet the Coyote finds plenty of food, and although not beset by the terrific biting blizzards that are the winter trial of the big Northern Coyote, he has to endure the furnace-like heat of summer, with long occasional periods of drought, when water-holes become dry, plant life becomes dormant, and a large part of the smaller mammal life perishes. Nevertheless, it must be remembered as an axiom, given food enough, most animals are indifferent to climate, and this is not only true of the Desert Coyote, but possible of a still larger interpretation, for given succulent food enough, the desert animals can commonly dispense with water. This is not absolutely proven for the Coyote, but it is proven for several other creatures that elsewhere drink copiously, and in the hot sandy regions, never drink at all.

[2] C. H. Merriam: Revision of the Coyotes, pp. 30–31.

## Food

The Desert Coyote is, of course, omnivorous, like its kinsfolk. "In seasons of plenty," says Nelson, "Rabbits, Kangaroo-rats, Pocket-gophers, and many other desert Rodents cost only the pleasant excitement of a short stalk. With the changing seasons the flesh diet is varied by the sugary mesquite beans, juicy cactus fruit, and other products of thorny desert plants. Wherever sufficient water is available for irrigation, small communities of Indians or Mexicans are to be found. About such centres many Coyotes usually establish themselves and fatten on poultry, green corn, melons, and other fruits provided by the labour of man. Many of them also patrol the shores of the Gulf of California and feast upon the eggs of turtles and other spoils of the sea.

"The arrival of men at a desert water-hole is quickly known among these alert foragers and when the travellers arise at daybreak, they are likely to see the tell-tale tracks on the sand where one or two Coyotes have walked in and out between their sleeping places and all about camp. Shortly afterward the campers, if inexperienced, may learn that bacon and other food are contraband and always confiscated by these Dogs of the desert. These camp-marauders often stand among the bushes only 75 or 100 yards away in the morning and watch the intruders with much curiosity until some hostile movement starts them off in rapid flight."[3]

My own acquaintance with the Desert Coyote was made on the Mohave Desert, near Imperial Valley and in the region south of Tucson. There was nothing in its food, habits, haunts, or tracks to distinguish it from its big gray kinsman of the Northern Plains, and each evening and each dawning it sang the same wild thrilling song from a safe distant rising ground as does the Song-dog of the better-watered Plains.

[3] Wild Animals of North America, p. 424.

## LIFE XI—THE ARCTIC FOX


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## Arctic Fox, White Fox, Polar Fox, Stone-fox, Blue-fox, Brown Fox, Sooty Fox, Pied Fox, Greenland Dog, Snow-dog, or Isatis

*Alopex lagopus* (Linnæus)

(*Alopex*, Greek for Fox; *lagopus*, hare-footed, from Greek, *lagos*, a Hare and *pous*, foot; because its soles are covered with a dense, bristly coat as in the Hare.)

*Vulpes lagopus* Linnæus, 1758, Syst. Nat., 10th ed., p. 40.
*Alopex lagopus* Kaup, 1829 Skizzirte Entw. Gersch. u. Naturl. Syst. Europ. Thierw., I, p. 83

Type Locality—Lapland

French Canadian, *Renard blanc, Renard bleu.*
Cree, *Wappeeskeeshew, Makkeeshew.*
Eskimo, *Ka-túg-u-li-a-guk.*
Chipewyan, *Et-thip-py.*
Siberian (probably), *Isatis*, the aboriginal name offered for our use by Buffon who got it from Gmelin, 1760.

The genus *Alopex* (Kaup, 1829) was established with the White Fox of northern Europe as the type. It differs from the true Foxes of the genus *Vulpes* in the skull, which is intermediate between those of *Vulpes* and *Canis*, and in the ears, which are short and rounded.

G. S. Miller cites Collett's *Norges Pattedyr* (1911, p. 275), for evidence of the complete sterility of Arctic Fox and Red-fox, indicating wide physiological divergence between them, though they were long referred to the same genus. (Mamm. West. Europe, 1912, p. 319.)

In general form, *Alopex* is like *Vulpes*, but the muzzle is shorter, and the soles of the feet are covered with the dense woolly hair already mentioned as giving the specific name. In summer, it has a coat of short fur which is brownish gray; in winter, its fur is very deep, dense, soft, and everywhere pure white.

To these generic characters, the White Fox adds the following:

*Size.* Length, 31 in. (787 mm.); tail, 10¼ in. (260 mm.); hind-foot, 4½ in. (115 mm.).

*Weight.* (Pribilof race) ♂'s, usually 8 to 14 lbs., but as low as 5½ lbs.,

and up to 20¼ lbs.; ♀'s usually 7 to 10 lbs., but as low as 4 lbs., and as high as 20¾ lbs. A new-born pup weighed 2¼ oz.[1] It will be noted that it weighs about the same as the Polar Hare.

Lyon says of the White ones taken at Winter Island: "The general weight was about 8 lbs., although some were as low as 7, and a few as high as 9½, when in good case."[2]

Near Cape Sabine where Greely killed 20 Blue-foxes and 5 White, the Blue averaged 3½ lbs. each, the White 4½.[3]

*Colour. In summer.* A typical specimen of *innuitus*, dated July 19, 1909, from Kuparok River,on the north coast of Alaska (Am. Mus. 31331), is as follows: All above, including the broad bar across the shoulders, the upper surface of the tail, the outer side of each limb, and the entire head, sooty brown, darkest on the head, and more or less peppered with light tips to the hairs. All the under-parts and flanks of a dull yellowish white, which on the flanks, haunch, and breast is tinged with buff. The head and paws, grizzled with a plentiful sprinkling of white hairs; ears, lined and edged with white. A few long, scattering white hairs of the winter coat are still found all over this skin.

*In winter*, the coat is pure white all over. The black nose and light hazel eyes alone break the exquisite white purity of its snowy fur, making a protective colouration of bewildering completeness. If the Fox be at a very little distance, sitting or running, it is nearly impossible for the eye to follow it. The tail gland is well developed, but the fur must be separated before any tinge of the yellow musk is seen.

In the *blue* phase, the coat is quite different from that of the summer. It is everywhere bluish drab, or smoky, washed with brownish on head and feet, and with a few white hairs on face and throat. The strong woolly hair on the soles of the feet, dull yellowish white, as in the white-coated animal.

The blue phase is, in some respects, to the White Fox what the black phase is to the Red-fox or to the Graysquirrel; that is, a mere colour freak found in nearly all parts of the region which the creature inhabits. Both colours occur, indeed, in the same litter, as also in the Graysquirrel, of which the black form is found chiefly in the North, so the Blue-fox is the predominating Fox type on the islands of the Bering Sea; it is rare elsewhere and becomes more so as one goes east, except that, according to Prof. Alfred Newton, in Iceland nearly all the Foxes retain their dark livery the year round.[4]

[1] Prib. Ids., p. 111.

[2] Priv. Jour., p. 74.

[3] 3 Years, II, p. 368.

[4] Proc. Zoöl. Soc., 1864, p. 497.

PLATE LXXX.—ARCTIC FOX IN EARLY WINTER
By E. T. Seton
From drawing loaned by New York Zoological Society

On Pribilof Islands, the white-coated Foxes, never very numerous, have been largely eliminated. The same condition obtains on the Aleutians.

In Siberia, Captain Hooper of the U. S. S. *Corwin* found Blue-foxes more plentiful than on the American coast.[5]

As Richardson points out, the majority only of these animals "acquire the pure white dress even in winter; many have a little duskiness on the nose, and others, probably young individuals, remain more or less coloured on the body all the year. On the other hand, a pure white Arctic Fox is occasionally met with in the middle of summer and forms the variety named *Kakkortak* by the Greenlanders."[6] Greely's party caught one Sept. 16th.[7] This parallels the case of the Greenland Hare, which is white the year round, and probably arises from the same cause—the summer season is too short to allow for a complete change to the summer dress.

The colour of the White Fox for several months after it is born is very similar to the adult Blue-fox's normal pelage.

"At St. Michael's," says Nelson, "among the thousands of skins brought in each year, not over 1 Blue-fox was observed among every 15 or 20 White Foxes, and the proportion was sometimes less. I afterward found this proportion to hold good for the skins seen among the Eskimo of the Bering Strait Islands and the Alaskan and Siberian Arctic coast in the vicinity of the Strait. Farther to the north, the Blue-fox becomes more and more scarce. The habits of the two forms are identical."[8]

## Races

The following 6 forms of the Arctic Fox have been recognized, 4 of which are North American:

*lagopus* Linnæus, the typical form; European, but believed to extend eastward along the Siberian coast, and even to Bering Island in Bering Sea; probably not American. White in winter. T. l., Lapland.

*innuitus* Merriam, similar cranially to *lagopus*, but with braincase broader and more pyriform. White in winter. T. l., Karogar River, Point Barrow.

*ungava* Merriam, similar to the last, but slightly larger. White in winter. T. l., Ft. Chimo, Ungava.

*pribilofensis* Merriam, largest of these Foxes, skull much elongated,

[5] Petroff: Fisheries & Resources of Alaska, 1897, III, p. 255.

[6] F. B. A., I, p. 84.

[7] 3 Years, II, p. 3.

[8] Nat. Hist. Alaska, p. 241.

almost like that of a Red-fox. At all seasons, a sooty blue all over. T. l., St. George Island, Pribilof group.

*beringensis* Merriam, nearly the same size as the last, but with shorter, broader rostrum. At all seasons, of a sooty blue. T. l., Bering Island, at the Asiatic end of the Aleutian Chain.

*hallensis* Merriam, similar to *lagopus*, but smaller, with shorter, broader skull. T. l., Hall's Island, Bering Sea.

### Range, with Map

In general, the range of the White Fox is circumpolar, extending as far south as the timber line and as far north as there is land. It is found in all the Arctic portions of the Asiatic and European mainlands. In America, its range is as shown on the map, keeping exactly to the limits of the Arctic Zone, and covering all of the Arctic Islands from south Greenland to Point Barrow at least, from Banks Land to Iceland, and from 83° 24′ on the north (which happens also to be the northern limit of land), to the southern limit of the Arctic fauna.

One by one, the Polar Islands have been entered on the Fox map by Arctic explorers. It is unnecessary to give all these records; I spot the map only with those around the outside. If the edges of the carpet are well nailed down, one need not worry about the inside breadth. These, then, hold down the edge: Prince Patrick Island (Sledging Party of *Resolute;* see Jones's *Arctic Manual*, 1875, p. 498); Melville Island, found throughout the year (Parry's "Second Voyage," 1824, Suppl. p. clxxxiv); Beechey Island, North Devon and Bering Bay (McCormick, "Voyages," 1884, II, pp. 63, 120, 142); Banks Land (A. Armstrong, "Disc. N. W. Pass.," 1857, p. 426).

The following note by Captain McClintock shows that on the Northwest Parry Islands the Fox is rare:

"No trace of Oxen, Deer, Foxes, or ptarmigan beyond the 77″ parallel, except in one instance, when a decayed bone of a Deer and traces of a Fox were found. Up to 77° N., Fox tracks were frequently seen, although we never saw the animal. Lemmings were tolerably numerous wherever there was vegetation."[9]

In Grantland, Gen. A. W. Greely found the Arctic Fox common up to lat. 82°N., and mentions it frequently in his "Three Years of Arctic Service."

It is common along the coast line of west Greenland between lat. 60° and 61°.[10]

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[9] Quoted by T. Rupert Jones in Nat. Hist., etc., Greenland, 1875, p. 498.

[10] Dan. Greenland, pp. 104–05.

were the Blue-fox. They were killed every month from October to February inclusive."[15]

As a readjustor of this Snow-child's known habitat is the southward emigration craze discussed later, and the following extralimital records are evident results of this impulse.

### Extralimital and Other Records Shown on the Map

At Carlton House, "only 2 were seen in 40 years."[16] In 1876, 5 were taken at Cumberland House; in 1873, 3 at Moose Lake; in 1884, 2 at The Pas, and 16 at Pelican Narrows; in 1886, 2 at Rapid River, and at Lac du Brochet 785; in 1890, 1 at Portage la Loche; a few on the south shore, and more (about 42) each year at the east end of Great Slave Lake; once taken on Peace River; about 23 each year from Fort Rae.[17] The U. S. National Museum has specimens from Kenai Peninsula and Kadiak Island. Osgood says: "One was killed by fishermen at Igagik in the spring of 1902. They are also said to be found in the Togiak District, and very rarely at Nushagak."[18] B. R. Ross records it from "the south shore of Great Slave Lake and a single blue one on the north shore."[19]

Taken in numbers at Fort Smith, Fort Resolution, and Fort Rae in 1900–01; at Fort Norman regularly; at Ft. Good Hope and McPherson.[20]

The Hudson's Bay Company men told me that in the winter it is often taken at Fort Chipewyan, as well as near Fond du Lac, at the east end of Athabaska Lake; also southward even as far as Cree Lake.

Once taken at Oxford Lake, and, according to J. K. MacDonald, Hudson's Bay Company factor at Norway House, the Foxes came in numbers to his Post in 1900–01.[21]

To James Bay, southern part, Hamilton Inlet, Hebron, Belle Isle, Lake Michikamaw, and to Lake Nichicum.[22]

Owen Griffith, Hudson's Bay Company factor at Albany Post, writes me, July 29, 1922: "As regards the distribution of the White Fox in James Bay: they are quite uncommon around both Moose Factory and Albany, and only a few stray ones are caught every season so far south; as one pro-

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[15] 3 Years, II, p. 368.

[16] F. B. A., I, p. 87.

[17] MacFarlane: Mackenzie Basin, 1908, p. 197.

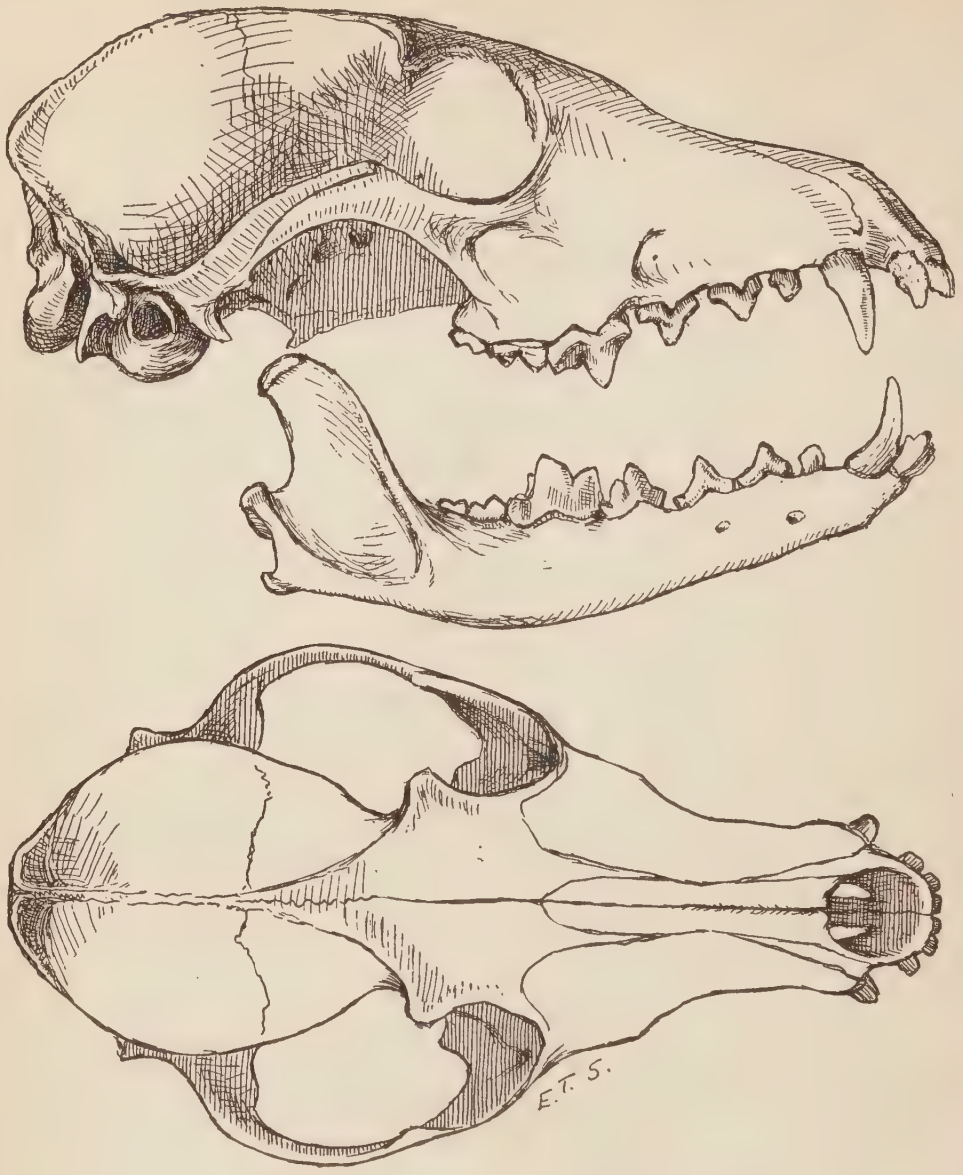
[18] N. A. F., 24, p. 40.

[19] Mammals, etc., Mackenzie River District, Can. Nat. & Geol., 1862, Art. XIII, p. 138.

[20] Preble: Mamm. of Keewatin, N. A. F., 27, pp. 217–18.

[21] As above, p. 63.

[22] Bangs: Mamm. Lab., Am. Nat., 1898, p. 504.




Genus Alopex.

Plate LXXXI. Skull of Arctic Fox ♂ (innuitus) ⅓
Mackenzie Delta. American Museum 31335

ceeds farther north, they become more numerous on both sides of the Bay, and large numbers are killed at Great Whale River on the east coast and Opinaga on the west coast."

The Newfoundland record "Occasional" was sent me by J. P. Howley, Director of the Museum at St. John's, Newfoundland; similar testimony is offered by Bachman.[23]

"Occasionally seen in Labrador, Newfoundland, and on two occasions, on Anticosti, which island it reached probably on ice."[24]

J. L. DeVany sends the following to the *Canadian Field Naturalist*, for Sept., 1923, p. 118. This is the southmost record.

"A White or Arctic Fox was shot at Lingan Bay on the east coast of Cape Breton Island on April 10, 1923, by William Ferrow and Neil Boutelier, residents of that district. . . .

"In the spring of 1922, there was a notable migration of White Foxes from the north to the southern coast of Labrador."

### Haunts

The chosen surroundings of the White Fox in summer are open plains or rocky hillsides indifferently, so long as they are not in thick woods or in swampy grounds. The wilder and more rugged the country, the nearer to its taste; and its ideal home is apparently among rocky, precipitous cliffs, especially along the coast, for here it finds in summer the nesting places of the birds, and all the year such sheltering nooks and caves as best serve it for home or storehouse.

It makes, however, a marked change in the winter. Stefansson writes that the White Fox is almost as much of a sea animal as the Polar Bear, for probably 90 per cent. of White Foxes spend their winters on the ice.[25]

### Amazing Numbers

From all parts of its 5,000,000 square-mile range the White Fox is reported as abundant. No Arctic explorer yet has failed to find it when on land; and, with the possible exceptions of the Caribou and the Polar Hare, it seems to be the most plentiful of all the large animals. To give a concrete idea of its abundance is possible in certain localities only. Thus at Port Kennedy, about 72° N. lat., north point of Boothia Felix, where Capt. F. L. McClintock wintered and spent 11 months in 1858–59, his game list was 2 Bears, 8 Caribou, 9 Hares, 19 Foxes, 82 ptarmigan, 98 wildfowl, 18

[23] Q. N. A., III, p. 96.

[24] Wm. Couper: Notes on Mammals of Canada, Forest & Stream, June 14, 1877, p. 300.

[25] Friendly Arctic, p. 155.

Seals, as well as several Ermines and Lemmings.[26] From which we may argue the Fox to be the most abundant of the larger animals.

At Winter Island (about lat. 66°, long. 84°), in the winter of 1821–22, Capt. George F. Lyon captured between 80 and 90 Foxes, more than 70 of which were taken before the end of December. On the night of Nov. 25th, he caught 15 in 4 hours with a single barrel-trap.[27]

A similar game list made by MacDougall at Dealy's Island, south shore of Melville Island, from September 3, 1852, to September 9, 1853, is equally illustrative. It runs: Muskoxen, 114; Reindeer, 95; Hares, 146; Bears, 6; Wolves, 3; Foxes, 51.[28]

Greely says: "In 1883–84, we killed 25 Foxes."[29]

According to the Can. Govt. Report on Muskox and Reindeer, 1922, (p. 74), 2,000 White Foxes were collected by traders on Kent Peninsula during the winter of 1919–20. Evidently this place is on the migration route between Victoria Island and the mainland.

At Ungava, says Dillon Wallace, an average hunter will take from 50 to 70 Foxes in a season, though one or two exceptional trappers have captured as many as 200.[30]

The Hudson's Bay Company men tell me that at Fort George one man killed 450 Foxes in one winter, and others even more.

"While cruising along the coast between Bering Straits and Point Barrow, during the summer of 1881, hundreds of their skins were brought off to us by the Eskimo; they were found in equal numbers along the opposite Siberian coast."[31]

Hearne says: "I have known that for 3 years running, not less than from 200 to 400 have been caught each year within 30 miles of the Fort [Churchill]. . . . I have frequently known near 40 killed in one night, within half a mile of Prince of Wales's Fort [during the migration], but this seldom happens after the first or second night. . . . In some years [they] assemble in considerable numbers at York Fort and Severn River."[32]

In Greenland, 1,500 Foxes are killed yearly. The greatest number was 5,000 in 1874. About half of these are caught between latitudes 60 and 61, on

[26] Voyage of the Fox, p. 299.

[27] Parry's Second Voyage, p. 151.

[28] Voy. Resolute, p. 529.

[29] 3 Years, II, p. 368.

[30] Long Labrador Trail, 1907, p. 236.

[31] Nelson: Nat. Hist., Alaska, p. 239.

[32] Journey, pp. 363–64.

the coast, for of course there are none on the great glacier which covers all but the rim of Greenland.[33]

The sales of the Hudson's Bay Company are usually a fair index of the abundance of fur-bearing animals; in this case, they probably fail because the skin of the White Fox was until lately of low value. In the period between 1853 and 1877, they averaged marketing near 5,000 skins each year. The great years were 1856, 1864, and 1869, which showed respectively, 10,311, 12,242, and 12,088. The lean years were 1855, 1859, and 1871, showing respectively, 1,897, 1,577, 1,805 skins.[34]

It must be remembered, of course, that a skin is sold the year after it is taken, and that probably not half of those captured by the natives were marketed.

During the great fur harvest, 1921–22, according to the Canadian Government official report on "Fur Production in Canada, 1923," 40,927 White Fox pelts were taken in Canada.

In 1922–23, the Northwest Territories and Yukon yielded 26,047 White Fox pelts.[35]

In the spring, the Arctic Fox is subject, at times, to a curious disfigurement. When the sun is hot, the ice often becomes covered with a thin film of water, and when a Fox sits down in this, the water in his shadow being protected from the sun, quickly freezes. Thus when he decides to depart, his hair is frozen to the ice; and freeing himself with a wrench, he leaves behind the tips of many long hairs. A few experiences of this sort ruin the posterior part of his coat.

## The Great Trek

The summer range of the White Fox includes all the *land* within the dark area on the map; so does the winter range, but the latter also includes the frozen *sea*. And further, this creature makes annually a nation-wide migration or rather emigration, that is a close parallel to that of the Gray-squirrel and is due to the same impulse, namely, the overcrowding of the breeding grounds in the North, which necessitates a search for food farther afield.

The history of this movement seems to be much as follows: Fox pairs have each their own home range, their exclusive summer hunting ground. From this they do not wander far, and for it they will fight to the death against any intruding Fox or Foxes. It is just enough for them and no

[33] Dan. Green., pp. 104–05.

[34] Mamm. N. Can., p. 200.

[35] Natural Resources Canada, April, 1924, p. 3.

more, so that, in autumn, when the numerous young are full grown, the range becomes overcrowded. Then the family tie begins to weaken, the parental love fails, and finally the cubs are told in some convincing way that they must now strike out and face the world for themselves. So with lusty bodies and such wisdom as their parents have been able to impart in 5 or 6 short months, they set out to seek their fortunes, just like millions of younger sons in our own walk of life.

From far-off lat. 83°, 24′ to their south line, and from Point Barrow to Disko, the impulse to go is born apparently in every junior Fox. But what is it that dictates the direction? We cannot tell. It may be the north wind, it may be the shape of the land, or the movements of Caribou or ptarmigan, that is, the possibilities of food; or it may be magnetic currents. No one knows.

In some migrant birds we find that the old ones who know the road are the guides that lead the way. But in the case of the young Fox this is quite out of the question, for none of those who make the journey ever did it before, or will ever do it again. The impulse is blind and deep-laid, like that which leads the Gray-squirrel, the Lemming of Norway, the Caribou of America, and the Springbok of Africa, and—one time—led the Teuton hordes of Central Europe, always on a southward route.

The parallelism of the movement with that of the Gray-squirrels and Lemmings is further evidenced by the fact that it is not at all regular.

As to the exact time of the migration, observers differ. Some make it mid-autumn and some mid-winter; which discrepancy doubtless means that it takes place at different times in different regions, and varies in different years, depending, no doubt, on stress of weather and dearth of food.

Richardson says: "Toward the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast, and going much farther to the southward in districts where the coast line is in the direction of their march."[36]

Captain Parry relates that the Arctic Foxes, which were previously numerous, began to retire from Melville Peninsula in November, and that by January, few or none remained.[37]

Hearne, who was the first to describe the movement, says: "The Arctic Foxes are in some years remarkably plentiful, but generally most so on the Barren-ground, near the seacoast. Notwithstanding what has been said of this animal only visiting the settlements once in 5 or 7 years, I can affirm that there is not one year in 20 that they are not caught in greater or

[36] F. B. A., I, p. 87.

[37] 2nd Voy., p. 387.

less numbers at Churchill. . . . They always come from the north along the coast, and generally make their appearance at Churchill about the middle of October, but their skins are seldom in season till November; during that time they are never molested, but permitted to feed around the Fort, till by degrees they become almost domestic. The great numbers of those animals that visit Churchill River in some years do not all come in a body, as it would be impossible for the fourth part of them to find subsistence by the way; but when they come near the Fort, the carcasses of dead Whales lying along the shores, and the skin and other offal after boiling the oil, afford them a plentiful repast, and prove the means of keeping them about the Fort till, by frequent reinforcements from the northward, their numbers are so far increased as almost to exceed credibility.

"When their skins are in season, a number of traps and guns are set, and the greatest part of them are caught in one month, though some few are found during the whole winter. . . . When Churchill River is frozen over near the mouth, the greatest part of the surviving White Foxes cross the river, and direct their course to the southward, and in some years assemble in considerable numbers at York Fort and Severn River."[38]

And still on southward, drifting in ever-dwindling waves till the last concentration along the two shores of the Bay, lands a scattering remnant to peter out at Moose Factory, the southmost point of their region, the last south outpost of their great Lone Land.

"In like manner they extend their migrations along the whole Labrador coast to the Gulf of St. Lawrence. Most of those which travel far to the southward are destroyed by rapacious animals; and the few which survive to the spring breed in their new quarters instead of returning to the north. The colonies they found are, however, soon extirpated by their numerous enemies. A few breed at Churchill, and some young ones are occasionally seen in the vicinity of York Factory."[39]

Whether they all are killed, or what becomes of those which escape, is very uncertain; but "it is well known that none of them ever migrate again to the northward."[40]

Thus ends the great and periodic, but not quite annual, emigration of the White Fox. The movement is not a true migration, for it is not regular and there is no return movement. It is merely the forcing out of the surplus population, which goes into a far country to be destroyed by the dangers of a new and unaccustomed environment.

[38] Journey, pp. 363–64.

[39] F. B. A., I, p. 88.

[40] Hearne: Journey, p. 364.

### His Broad Views on Diet

The White Fox is a Fox; therefore, his dream of alimentary bliss is chicken; chicken of any kind, web-foot or split-foot, and of any age, old or young, fresh and hot, or dead and putrid, feathered and flying, new-hatched or fluid on the half-shell.

During the bright beautiful summers of the Polar Isles the Fox is ashore feasting on birds and Lemmings, principally the latter. But winter with deep snow makes a change. The hardy adventurous Foxes are driven to sea, and there they find a staple food supply in the little auks or dovekies that fly or swim or spot the ice floes still; for they are there not only through all the short bright summer, but a part of dreary winter too.

On Feb. 1, 1858, Captain McClintock found a Sooty-fox on a floe 130 miles from the nearest land. But it was very fat and seemed happy, "hence we argue dovekies were much more numerous during winter than we supposed."[41]

The nesting time for birds is, of course, a time of carnival for the Foxes. During that, they eat, drink, make very, very merry, and multiply. Each realm of life at this season contributes to their feasting. Captain McClintock writes:

"2nd July, 1859,—Yesterday, one of the men brought on board a trout weighing 2 lbs.; he saw a glaucous gull and a Fox disputing for it; the former seems to have killed and brought it to land."[42]

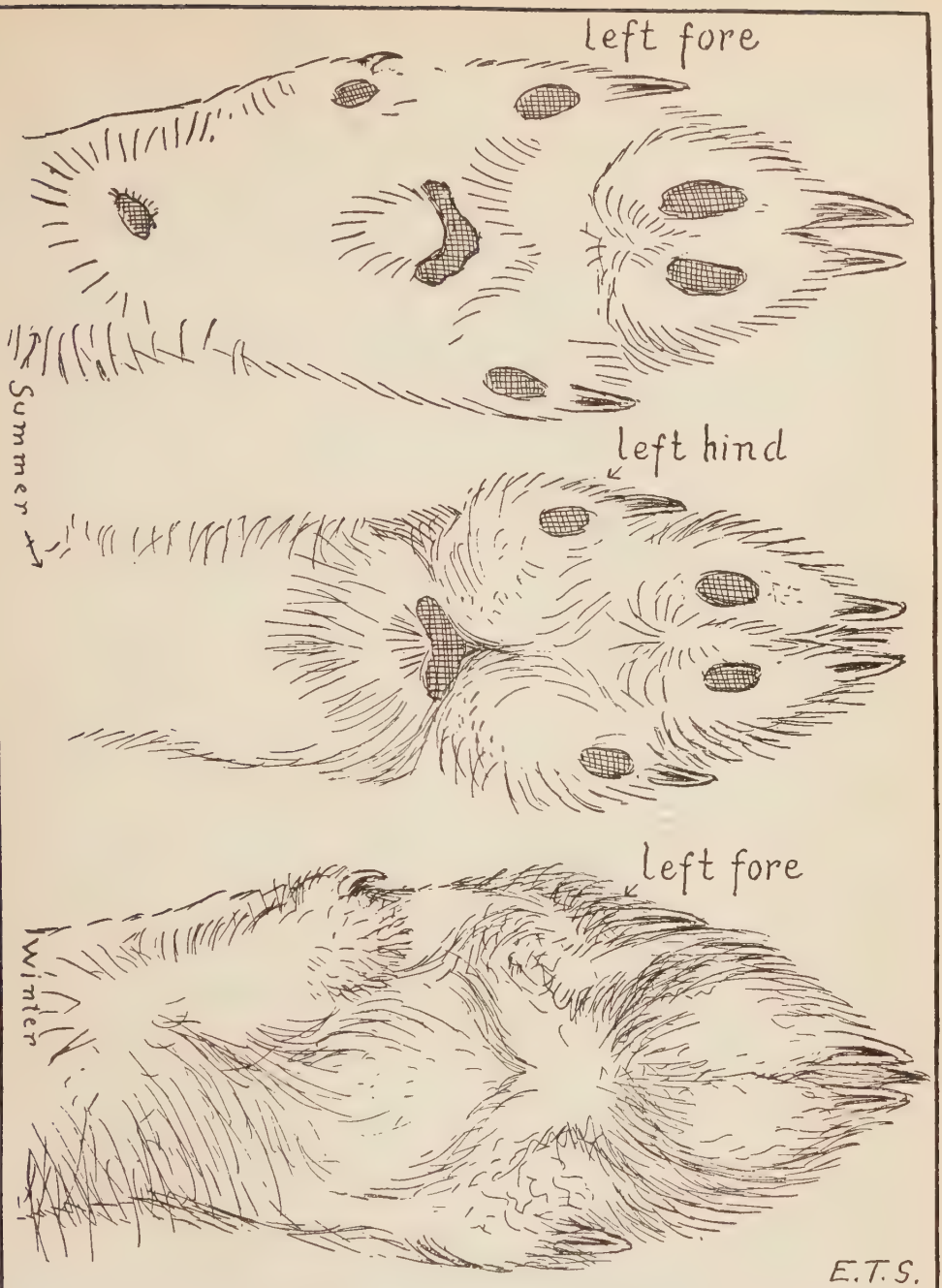
In Attu, an island of the Aleutian Chain, off the southwest coast of Alaska, Turner says the ptarmigan "frequent the higher elevations, probably on account of the great number of Foxes (*Vulpes lagopus* Baird), which occur on that island, and have but little to subsist on. The natives of Attu assert that this same species of ptarmigan occurs on Agattu Island, and that it is quite numerous there, probably on account of the absence of Foxes."[43]

But birds are the Fox's dainties. His stock food is probably the Lemming, that curious little bobtailed Snow-mouse which is found in one form or another, summer and winter, on every stretch of land throughout the whole realm of the White Fox, and whose sole job in life seems to be gathering and grinding up grass, moss, and lichen in his wonderful little body, and transmuting these into the higher terms of flesh and blood, for the helping of his betters, whose chemic powers are less than his; and which

[41] Voy. Fox, pp. 79–80.

[42] As above, p. 292.

[43] Contrib. Nat. Hist. Alaska, p. 156.




Plate, LXXXII. Soles of Arctic Fox - from dry skins. 1/1.

Lemming teems so prodigiously that it makes the proverbially prolific Guinea pig kind look like dying remnants of a species that is overwhelming itself with race suicide. The Lemming, then, is the staple food of the White Fox, for it is with him the year round. But he has at least 100 and "57 varieties" on his list, for his definition of food is: "Anything that smells in the least like grease." So exactly does he apply this religious dogma that Armstrong found a Fox whose stomach was distended with the hair and a portion of the hoof of a Caribou.[44] In the stomach of another he found small pieces of dwarf willow. Maybe it had got greased in some way, for so far no one else has noted their feeding on grass, leaves, or even fruit.

A still more reckless application of the grease-smell test is supplied by Nelson, who says: "Near the entrance of one of these burrows, I inadvertently left a notebook, and when I returned for it an hour later, it had disappeared, having been confiscated, no doubt, by the occupant of the hole."[45]

Ivan Petroff, in his 1883 report, says: "They may be called omnivorous, and they refuse nothing that will fill their stomachs. I observed one sleek and apparently well-fed specimen which devoured nearly the whole of a large salmon, and afterward worried down, with considerable difficulty, a thick leather strap with a heavy buckle attached to it. In the depth of winter, the natives find it unsafe to leave any article of clothing, Dog harness, or boat material within their reach."[46]

"As a proof of what Foxes will eat to satisfy hunger," says Captain Lyon, "I may mention having examined the stomach of one which contained a mass of rope yarns and line, of the size of the doubled fist; amongst which some pieces of sinnet or plaited stuff were above 6 inches in length!"[47]

"On the hillside to the west of the Lagoon [St. Paul Island] and over toward Lukanin, I frequently heard the harsh bark of the Fox proceeding from among the piles of rock, and here and there the little brown head of a cub would appear at the mouth of a burrow. All about these burrows were scattered fragments of sea-birds' bones, of skulls and limbs of Fur-seal pups, and other similar relics of repasts. Once I observed a Fox trotting along toward its burrow with a fresh Fur-seal placenta in its mouth, and Foxes may be frequently seen on the outskirts of the rookeries hunting for placentas.

"During the summer all these articles, as well as birds' eggs, are eaten

[44] Disc. N. W. Pass., 1857, p. 304.

[45] Nat. Hist. Alaska, p. 240.

[46] Fur Seals, pt. III, p. 339.

[47] Priv. Journ., p. 78.

by the Foxes, but in winter they lead a somewhat precarious existence and subsist largely on sea urchins (*Strongylocentrotus drobachiensis*), which they obtain at low water. During the fall of 1896, the Foxes devoured all the Seal pups which had perished of starvation caused by pelagic sealing.

"The fields all over the islands are traversed by Fox trails, and many lead up and down across the face of the precipitous cliffs that bound the islands at different points."[48]

"During summer they fare sumptuously upon the breeding waterfowl, eggs, and young birds which are found everywhere, but in winter comes harder work and the ground is carefully searched for stray Mice, Lemmings, or an occasional ptarmigan. In early spring, toward the end of March, when the Seals begin to haul up on the ice and the first young are born, thousands of these Foxes go out seaward and live upon the ice the rest of the season. The young Seal's offal, left by the hunters and from other sources, gives them more food there than the shore affords at this time.

"At this season I have travelled along the coast and seen scores of their tracks leading seaward, and not one directed toward the land. In fall, a dead Whale or other large sea animal cast ashore forms a general feast for all the Foxes and ravens from the country around until its bones are polished."[49]

When in winter this happy-go-lucky little Snow-dog has the rare good luck to secure a big fat Arctic Hare, nearly as heavy as himself, his fortune is made for a week at least.

Henry W. Elliott's picture of bird and Fox life on a rugged sea island is well worth reproducing:

"Walrus Island is the most favourable spot in this whole Alaskan country to observe the nesting and breeding birds of Bering Sea. It is a low lava rock, 7 miles to the eastward of Northeast Point, with an area of less than 5 acres, rugged and bare of all vegetation, save a species of close-growing curly grass. Here the *Lomvia arra* and many gulls, cormorants, sea-parrots, and auks come to lay their eggs in countless numbers. The face and brow of the low, cliff-like sea-front are occupied almost exclusively by the 'arries' (*Lomvia arra*), which lay a single egg each on the surface of the bare rock, and stand straddling over it while hatching, only leaving at irregular and short intervals to feed. Hundreds of thousands of these birds alone are thus engaged about the 29th of June on this little island, standing stacked up together like so many bottles, as thickly as they can be stowed, making all the time a deep, low, hoarse, grunting noise. They quarrel

[48] F. W. True, Mamm. Prib. Fur Seals, pt. III, p. 349.

[49] Nat. Hist. Alaska, pp. 239–40.

among themselves incessantly, and in this way roll thousands of eggs off into the sea, or into crevices and fissures, where they are lost and broken."[50]

Now this pioneer naturalist goes on to tell us that the shell of the arrie's egg is of such remarkable strength, that it will stand rough handling that would in a moment destroy ordinary eggs; and that the natives tumble the egg crop about as they would apples. From this, one may infer that many of the tumbled eggs lodge more or less whole in crannies of the rock, or, falling into the sea, are washed ashore intact. Then he adds:

"I have, time after time, been struck by the wonderful temerity of the Foxes (on St. George's Island especially) while secretly watching them as they were climbing up and down the faces of almost inaccessible cliffs, seeking eggs. They go on a full run or a stealthy tread over the brows of the cliffs that fairly overhang the sea 600 and 900 feet below. They always bring the eggs up in their mouths, and carry them back from the brink of the precipice, where they leisurely suck them, usually biting the shell out at the larger end. The 'arrie' suffers the most from these enemies, which are the only natural foes that the bird-kind has to contend with on these solitary islands."[51]

It is a remarkable fact that no one yet has recorded the White Fox feeding on the crowberries (*Empetrum nigrum*), the manna of the Northern desert, a mainstay of most other creatures in the region.

### His Parasitic Food Habit

Many Arctic travellers have pointed out a quaint and natural parasitism on the part of the Fox that reminds us of the Jackal and the Lion, or the Coyote and the Cougar. Dr. E. K. Kane was the first to set it forth at length. He relates it as follows:

"There are fables about the relation between these two animals [Fox and Bear] which I once thought my observations had confirmed. They are very often found together: the Bear striding on ahead with his prey; the Fox behind, gathering in the crumbs as they fall; and I have often seen the parasite licking at the traces of a wounded Seal which his champion had borne off over the snow. The story is that the two hunt in couples. I doubt this now, though it is certain that the inferior animal rejoices in his association with the superior, at least for the profits, if not the sympathy it brings to him. I once wounded a Bear when I was out with Morton during our former voyage, and followed him for 12 miles over the ice. A miserable little Fox travelled close behind his patron and licked up

[50] Report upon the Condition of Affairs in the Territory of Alaska, 1875, pp. 170–71.

[51] As above, p. 172.

the blood wherever he lay down. The Bear at last made the water; and, as we returned from our fruitless chase, we saw the Fox running at full speed along the edge of the thin ice, as if to rejoin him."[52]

McClintock, too, observed this foxy trick. He says: "We have often noticed the tracks of Foxes, following up those of the Bears, probably for discarded scraps of the Seals upon which they prey."[53]

Greely had a glimpse of this arrangement, for he says at Greely Fiord in Grinnell Land, May 12, 1882, he "crossed the tracks of a Bear, going up the fiord, evidently followed by a Fox."[54]

And Stefansson gives us other details. After mentioning that in winter the Foxes take to the sea ice, he says:

"They are not able at sea to provide their own living, so several will be found following a Bear wherever he goes. When the Bear kills a Seal, he eats all he wants, usually from a quarter to half of the carcass. In many cases, he touches none of the meat, but eats merely a portion of the blubber and the skin that goes with it. After this satiating meal, he probably feels as if he will never care to eat again, and goes away to sleep under a neighbouring hummock, leaving for the Foxes what is left. It is not likely that he will come back, but if he did, the Foxes would hop and the gulls flutter away. From long experience, he gets the impression that these creatures are not the least bit dangerous, but too elusive to be caught."[55]

An interesting chapter on the food tastes of a captive Snow-dog is offered by Dr. E. K. Kane, as follows:

"If I was asked what, after darkness and cold and scurvy, are the three besetting curses of our Arctic sojourn, I should say *Rats*, *Rats*, *Rats*. A mother Rat bit my finger to the bone last Friday, as I was intruding my hand into a Bearskin mitten which she had chosen as a homestead for her little family."

A Dog was secured to combat the Rats in the cabin, but was driven off "yelping and vanquished." Bows and arrows were freely used, and Dr. Kane himself, not the men, learned to eat the fresh Rats as a helpful addition to the salty meat fare—a variant which he considers explained his "comparative immunity from scurvy." He says: "I had only one competitor in the dispensation of this *entremet*, or rather one companion; for there was an abundance for both. It was a Fox: we caught and domesticated him late in the winter; but the scantiness of our resources . . . and,

[52] Arc. Expl., I, p. 400.

[53] Voy. Fox, p. 80.

[54] 3 Years, II, p. 36.

[55] Friendly Arctic, pp. 155–56.

of course, his own, soon instructed him in all the antipathies of a terrier. He had only one fault as a rat-catcher: he would never catch a second till he had eaten the first."[56]

An admirable attitude, indeed. That Fox was a true sportsman, a sportsman who stops when he has all he can use, in contrast to the game-hog who kills, kills, kills, for the pleasure of killing.

This general observation may be made: Many a Polar traveller has killed Foxes and found their bellies absolutely empty, but no one yet has recorded a case of a White Fox starved to death or even near it.

There is, however, a dark chapter that must usually be written for flesh-eating animals under stress of famine. They become cannibals. That chapter must be entered here.

Hearne says: "These animals will prey on each other as readily as any other animals they find dead in a trap, or wounded by gun; which renders them so destructive, that I have known upward of 120 Foxes of different colours eaten, and destroyed in their traps by their comrades in the course of one winter, within half a mile of the Fort."[57]

### His Frugal Mind and Forethought

Reference to the article on the Red-fox will show that that species has a well-developed storage habit. It is probable, indeed, that every land quadruped which winters in the North and does not go into a winter-sleep or torpor, lays up a store of food in some shape or form.

The Caribou, the most striking apparent exception, lays up its store in the form of the "backfat" or hump, fully discussed in the chapter that belongs; but the White Fox is conspicuous for the method and number of his stores laid by for winter.

Richardson says: "On one occasion during our late coasting voyage round the northern extremity of America, after cooking our supper on a sandy beach, we had retired to repose in the boats, anchored near the shore, when 2 Sooty Foxes came to the spot where the fire had been made, and carrying off all the scraps of meat that were left there, buried them in the sand above high-water mark. We observed that they hid every piece in a separate place, and that they carried the largest pieces farthest off."[58]

Captain Lyon says of those he held captive on Melville Peninsula: "Their first impulse on receiving food is to hide it as soon as possible, even

[56] Arc. Expl., I, pp. 394–95.

[57] Journey, pp. 364–65.

[58] F. B. A., I, p. 90.

White Fox
Winter Coat
Plate Lxxxiii Studies of
Arctic Fox
by E.T. Seton
Summer Coat
Autumn
Coat
Crowberry
from live sp.
Aylmer Lake 18 Aug 1907
Summer Coat

though suffering from hunger, and having no fellow prisoners of whose honesty they are doubtful. In this case snow is of great assistance, as being easily piled over their stores, and then forcibly pressed down by the nose. I frequently observed my Dog-fox, when no snow was obtainable, gather his chain into his mouth, and in that manner carefully coil it so as to hide the meat. On moving away, satisfied with his operations, he of course has drawn it after him again, and sometimes with great patience repeated his labours 5 or 6 times, until in a passion he had been constrained to eat his food without its having been rendered luscious by previous concealment."[59]

Captain McClintock, after pointing out the scarcity of food during the 8 months of each year in Fox country, suggests that they store up food, and adds that his interpreter Carl Petersen, from Greenland, "thinks they store up provisions during the summer, in various holes and crevices, and thus manage to eke out an existence during the dark winter season; he once saw a Fox carry off eggs in his mouth from an eider-duck's nest, one at a time, until the whole were removed; and in winter he has observed a Fox scratch a hole down through very deep snow, to a cache of eggs beneath."[60]

At the fox-farm of E. Norton, Dover, Me., I learned in 1905 that the Blue-foxes invariably bury surplus food, then squat over the place to mark it, either with urine or dung. They dig it up and enjoy it as soon as hungry, but like it the better if it has had time to ripen a little.

Greely says of his two captives: "Whenever they received food, they endeavoured to conceal it, never eating it at once."[61]

But the most complete and convincing evidence comes to us from Grinnell Land, as follows:

During the Nares expedition to northern Greenland in 1875–76, Col. H. W. Feilden made some interesting observations on this Fox's habit of forming caches. On July 13, 1867, having shot a Fox in Grinnell Land, he sat down to rest near a patch of plants, when, he says, "many Lemmings popped up from their holes, and undismayed by our presence, commenced feeding on the plants. We noticed that numerous dead Lemmings were scattered about. In every case, these had been killed in the same manner —the sharp canine teeth of the Foxes had penetrated the brain. Presently, we came upon two Ermines, killed in the same manner. . . . Then, to our surprise, we discovered numerous deposits of dead Lemmings. In one hidden nook under a rock we pulled out a heap of over 50. We disturbed numerous 'caches' of 20 and 30, and the ground was honey-combed

[59] Priv. Journ., pp. 75–76.

[60] Voy. Fox, p. 70.

[61] 3 Years, II, p. 367.

with holes, each of which contained several bodies of these little animals, a small quantity of earth being placed over them. In one hole we found the greater part of a Hare hidden away. The wings of young brent geese were also lying about."[62]

There is, therefore, a great volume of evidence to show that all summer long, during the time of plenty, this wise little Fox lays up treasures for himself deep in the earth; and not very deep must he go in order to lay his Lemming tidbits on ice, and thus in cold storage. There is, of course, always a chance of the cache being robbed by hostiles, but each Fox makes, no doubt, many caches and marks each with his own mark, the odour of his protometric gland,[63] so that he can come again infallibly to the place in a time of need. There is every reason to believe that these summer-made stores are the secret of his safely living through the time of frost and starvation.

But (and this is a cardinal *but*), there is a good deal of evidence to show that these caches are made by the old Foxes only, and for their own exclusive use. The young ones make no cache, for they are not fending for themselves until late September. Then they are possessed of a roving spirit that prevents them from having a fixed abode or centring interest in one place, so that the provident instinct does not develop. When the winter comes, they have to find another means of subsistence; which they seek elsewhere, as already stated.

## His Thirst

There is one necessary of life that the happy White Fox can always count on getting in abundance, and that is drink. "Snow is the substitute for water to these creatures," says Captain Lyon, "and on a large lump being given them, they break it in pieces with their feet, and roll on it with great delight. When the snow was slightly scattered on the decks, they did not lick it up as Dogs are accustomed to do, but by repeatedly pressing with their nose, collected small lumps at its extremity, and then drew it into the mouth with the assistance of the tongue."[64]

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[62] Nares: Narr. Voy. Polar Sea, 1875–76 (pub. 1878), II, Appendix, pp. 193–94.

[63] The protometra or protometric gland is, according to Chauveau (p. 969, English version), a small pouch present in all domestic animals, and sometimes double, which secretes a fluid that is thrown into the urethra through a very small orifice near the *Verumontanum*.

George Fleming, the English editor, adds to this, that the gland is not a gland in the ordinary sense of the term, but is certainly the rudiment of the duct that develops into the uterus of the female. It is also called the *prostatic utricle* or *sinus pocularis*.

[64] Priv. Journ., p. 76.

### His Personal Cleanliness

Cats are usually more careful than Dogs in matters sanitary, but this little Snow-dog is most exemplary. Captain Lyon, after daily study of their habits during the two dreary winters he passed on Melville Peninsula, wrote:

"The Arctic Fox is an extremely cleanly animal, being very careful not to dirt those places in which he eats or sleeps. No unpleasant smell is to be perceived, even in a male, which is a remarkable circumstance."[65]

### Swimming

When one reads of this Fox's normal life among sea-birds, climbing cliffs, where a misstep would end in a deep sea plunge, or on floating ice within two steps of an involuntary bath, and among animals and birds whose whole life is in and about the sea, one is surprised to learn that the White Fox never voluntarily enters the water or attempts to swim. There can be no doubt that when the Fox actually tumbles in, it can swim out, for all four-footed animals swim instinctively. The reason for this is obviously that the same movements that propel them on land also propel them in water, so that they do not need to learn to swim. But, with one partial exception, no one yet has made record of a White Fox swimming voluntarily as do its southern relatives. The exceptional remark is by Dr. E. K. Kane. He says: "It is a mistake to suppose he cannot swim; he does, and that boldly."[66]

It is worthy of note here that neither Eskimo nor northern Indian can swim. When either falls into the water, he must be rescued or he will drown. For Fox, Eskimo, and Indian, the reason is much the same. The water is so deadly cold that human beings have no inducement to learn, while the Fox has no waterproof fur to keep him warm; therefore, all alike shun the icy flood.

### Tracks

"During my long winter journeys along the coast of Bering Sea," says Nelson, "the tracks of these Foxes were found everywhere; they were distinguishable from those of the Red-fox by their smaller size."[67] (See Plate CXVII.)

### Service to Man as Food

The most obvious use of the White Fox to man is as a fur-bearer, but in its native region, it is considered a first-class game animal and the source of a most acceptable supply of delicious food.

[65] Priv. Journ., pp. 74–75.

[66] Arc. Expl., I, p. 400.

[67] Nat. Hist. Alaska, p. 239.

PLATE LXXXIV.—ARCTIC FOX IN GRAY COAT
From photograph taken by Elwin R. Sanborn in New York Zoological Park

Hearne, who had every reason to know, says:

"White Foxes, when killed at any considerable distance from the sea coast (where they cannot possibly get anything to prey upon, except Rabbits, Mice, and partridges), are far from being disagreeable eating. And on Marble Island, I have shot them when they were equal in flavour to a Rabbit; probably owing to their feeding entirely on eggs and young birds; but near Churchill River they are as rank as train-oil."[68]

Many Polar explorers testify to the excellence of this Fox's flesh. Doubtless as a variant to vile, poisonous, scurvy-causing salted beef, most anything would seem delicious.

And Capt. G. F. Lyon says: "Their flesh, indeed, had so good an appearance, that many trials were made of it. All were horrified at the idea of eating Foxes, but very many soon got the better of their delicacy, and found them good eating. Not being myself very nice, I soon made the experiment, and found the flesh much resembling that of kid, and afterward frequently had a supper of it."[69]

## Fur

Summer furs of land animals are, of course, thin, harsh, and worthless. In the case of the Arctic Fox, the summer coat is still worn as late as September; but, by November, provided the animal is healthy, his fur is in prime condition and of a spotless white. At the same time, the coat of the Blue-fox acquires its softest blue-gray tint. In the case of both, the fur remains at its best till late in March.

Nevertheless, there is a very wide difference in the respective market values of the two. Other things being equal, the pure white fur is of lowest value. Blue pelts from the mainland are worth 3 times as much as the white, and the blue from the islands of the Bering Sea are worth 3 or 4 times as much as those of the mainland, the fur from the islands being, for some reason, darker, finer, and fuller than that of their kinsman on the mainland. The fur is best in the first and second years as is the case with most animals.

These island Foxes are now regularly ranched, fed, and protected as well as bred for quality, but that is a matter fully treated in another chapter.

During the last 10 years (1913–22) 5,982 pelts of Blue-foxes have been marketed from the Pribilofs. At one time $5 each was considered a fair price for Blue-foxes and $1 for White ones, but now they are much dearer.

[68] Journey, pp. 365–66.

[69] Priv. Journ., p. 64.

Preble says that "665 Blue-foxes sold at St. Louis, Sept. 10, 1919, brought an average price of $195.90. On Feb. 21, 1921, 901 Blue-foxes brought an average of $88.12, and 37 White Foxes brought $35 per skin. On Sept. 28, 1921, 1,125 Blue-foxes were sold at an average price of $96.83."[70]

### His Home Range in Summer

Each individual animal has, of course, a home range or territory that he considers home and for which he will fight. This property instinct is especially marked in those animals whose food supply is limited, such as hunters or harvesters; and it is doubly marked when they are of a kind that belongs to both groups. The reasons for this are obvious: it is a necessary outcome of the law of self-preservation.

The Arctic Fox has advanced far along these lines. Dr. F. W. True, while investigating on the Blue-foxes of Pribilof Islands, was followed frequently by these curious and semi-tame creatures, and on one occasion, pelted the Fox with pebbles to drive it back, but in vain.

"As I proceeded," he says, "the Fox drew near again, and followed me to the boundary of his domain, for each Fox, like his neighbour, the bull Seal, seemed to have a definite territory which he regarded as his own, and upon which he resented intrusion."[71] How large this domain is, True does not tell.

And now we come to a problem. We have seen that the White Fox lays up stores of food for the winter. These stores are, of course, on his home range. If he moves out on his great migration, he must leave his stores behind, and if he has stores, he has no need to go out.

Doubtless, the solution is that the old Foxes who have stores remain and the young ones, having none, move out. If an old one joins the Great Trek in search of food, it probably means that he had no chance to make a cache or else his cache was robbed. If a young one remains—and some must—it means that he was lucky in finding a food supply.

### Mating, Breeding, and Dens

There is abundance of evidence, and quite conclusive, that the White Foxes pair and are strictly monogamous. There is some evidence, mostly collateral, that they pair for life.

During the month of March, the mating is consummated, and gestation continues for about 8 weeks. Precise information is not available, but the domestic Dog goes 63 days and the Red-fox 51; therefore, the White Fox,

[70] Pribilof Islands, N. A. F., No. 46, 1923, p. 105.

[71] Fur Seals, pt. III, p. 348.

whose affinities are between the two, has probably a period between, say, about 57 days.

Over a hundred years ago, Samuel Hearne, with a breadth of experience not since exceeded, wrote that, without doubt, there were breeding places of the White Fox on "every part of the coast they frequent. Several of them breed near Churchill, and I have seen them in considerable numbers all along the west coast of Hudson's Bay, particularly at Cape Esquimaux, Navel's Bay, and Whale Cove, also on Marble Island; so that with some degree of confidence, we may affirm that they breed on every part of the coast they inhabit during the summer season."[72]

In 1829, Richardson, after exploring the region farther west, wrote: "They breed on the sea-coast, and chiefly within the Arctic Circle, forming burrows in sandy spots,—not solitary, like the Red-fox but in little villages, 20 or 30 burrows being constructed adjoining to each other. We saw one of these villages on Point Turnagain, in lat. 68½°."[73]

Miles Spencer, speaking of the east coast of Hudson Bay, says that there "the litters are produced in holes under rocks."[74]

When Nelson landed on Herald Island, off the Siberian coast, he saw a Fox cub which barked at him and then disappeared over the brow of a sheer precipice more than a thousand feet high, on the face of which he concealed himself in some crevice. "Their burrows," he adds, "were found everywhere, and about their entrance, numerous tufts of freshly pulled mosses showed the material of which their beds were made."[75]

Parry found the White Fox on Melville Island the year round, therefore breeding there.[76]

Finally, Preble writes that about 75 miles north of York Factory, "on a slightly elevated part of the tundra, we found a burrow occupied by a family of Arctic Foxes. This burrow was typical, an underground labyrinth with several entrances. In the vicinity were scattered the bones and feathers of various birds, principally ptarmigans, and well-worn trails leading in various directions gave evidence of the activity of the mother Fox, in providing for her family."[77]

There is one other type of burrow—that is, the winter den. Parry (or more probably his able assistant, Lyon) wrote that when these captive

[72] Journey, p. 365.

[73] F. B. A., I, p. 87.

[74] A. P. Low: Expl. James' Bay, Can. Geol. Surv.,1888, App. III, p. 76 J.

[75] Nat. Hist. Alaska, p. 240.

[76] 1st Voy., 1819–20, pub. 1821, App., p. clxxxvii.

[77] Mamm. Keewatin, p. 62.

Foxes were "placed with their houses upon the ice, they were constantly endeavouring to burrow in the snow within the circle of their chains, and one of them, where the snow lay deeper than usual, soon formed for himself a secure and sheltered apartment under it. When deprived of the means of doing this, they are far from being proof against the severity of the season, for 2 or 3 died on board the *Fury;* entirely from this cause, though furnished with good kennels."[78]

### Young

Some time in June usually, but earlier or later, from May to July, according to the region, the young are born. They number from 1 to 11, but are usually 4 or 5.

At birth, they are about the size of a big Meadow-mouse and look not unlike one. They are, of course, blind and helpless. They arrive, however, with a fine coat of fur, and this is of a blue-gray, a dingy smoke colour, or sometimes a sooty black, with occasional spots of white on breast and belly, precisely like those of an adult Blue-fox.

A note that seems to extend the younging time is supplied by McDougall from Port Griffith's, Melville Island. He writes, Sept. 2, 1853: "An old she-Fox, with 6 of her young cubs, was surprised by Mr. Dean, who killed the old Fox, and captured 4 out of the 6 young ones."[79]

Much earlier, that is, about the middle of June, on the Pribilof Islands, the youngsters, now about a month old, begin to come out and see the big world. A curious incident (from which one may draw any kind of moral one chooses) is given by George A. Clark, who was one of the observers sent to the Pribilof Islands, in 1896.

On June 29th he says, "we found a little Blue-fox pup lying outside a den. He looked sick—at least, was not afraid of us—and allowed himself to be handled and photographed. A second one, more timid but full of curiosity, came out of the hole and in a few minutes was ready to play. Mr. Morton offered it a piece of tobacco, which it bit and tried to pull away. Almost instantly the little fellow fell down in convulsions, becoming finally unconscious. It revived in a few minutes, but declined to play further. The incident was a rather unexpected argument against the use of tobacco."[80]

As they grow up, they show early the colours of the adult summer coat. According to Hearne, the "belly, sides, and tail turn to a light ash colour;

[78] 2d Voy., p. 151.

[79] Voy. Resolute, p. 318.

[80] Fur Seals, pt. II, p. 539.

the back, legs, some part of the face, and the tip of the tail, change to a lead colour; but, when the winter sets in, they become perfectly white. The ridge of the back and the tip of the tail are the last places that change to that colour; and there are few of them which have not a few dark hairs at the tip of the tail all the winter."[81]

## The Father's Part

If the rule of most *Canidæ* is adhered to, the father leaves home a few days before the arrival of the young and does not return until their eyes are opened. Now, indeed, he comes back. Miles Spencer is among those observers who assure us that the father Fox does his part in rearing the young, and does it with assiduity; which means, he brings game, especially birds, as soon as the cubs are big enough to eat solid food.

For two months this home life continues. Toward the end of August, the cubs are big enough to go a-hunting on their own. They may come back home for a while between hunts, but the parental bonds are already loosening; the old folks have done their duty. The scatteration urge is on the young ones, and long before the sharpening air of October has invited each and every Fox to don his snow-garb, the family ties are broken. The new brood are big folks now. They leave the old den and set forth with all the world before them.

But father and mother still hold on together. They did not forget to store up food when game was swarming about them. In the section on "His Frugal Mind," we have Richardson's picture of the pair working the harvest together. They are, in some measure, independent of the weather. But there is not enough food for the whole family. The young are not allowed to know anything about these hoards.

They must rely on their own powers as hunters, and some indeed, by luck or unusual gifts, can maintain themselves. But the majority, as the pinch comes on, join themselves to the innumerable cub-host, which, without assembling, drifts southward on the great out-trek described, never to return.

## Voice

In anatomy, these comic little Snow-dogs are somewhat nearer to Dogs than to Foxes. Their habits, also, are very doggy, and the noises they make are exactly those of some little cur-Dog on the street. First and best known is the bark.

"They sometimes make their presence known to travellers during the

[81] Journey, p. 365.

night," says Nelson, "and I recall particularly that on a fine night, in early January, when I camped at the mouth of the Kuskoquim River, a number of these animals kept about for several hours, within 75 to 100 yards of us, uttering an odd, weak, querulous bark. We broke camp before daybreak the next morning, but none of our friends of the previous evening were heard." [82]

"While hunting for food," says Lyon, "they are mute, but when in captivity or irritated, they utter a short growl like that of a young puppy. It is a singular fact that their bark is so modulated as to give an idea that the animal is at a distance although at the very moment he lies at your feet."[83]

"The voice of the Arctic Fox," according to Richardson, "is a kind of yelp, and when a man approaches their breeding places, they put their heads out of their burrows and bark at him, allowing him to come so near that they may be easily shot."[84] Very doggy is all this, but even more so is the picture given by F. W. True after his visit to the Blue-fox Islands.

"One is not long on the [Pribilof] islands before making his [the Blue-fox's] acquaintance, and his manœuvres are a continual source of interest. Now he will be seen trotting along in the distance, turning neither to the right hand nor the left, and again he will spring up almost from under one's feet, giving utterance to his high-pitched and querulous bark. There is something uncanny in the dogged persistence with which he follows one's footsteps, falling back and barking if one faces about, and drawing near again the instant one proceeds. I took pains on one occasion, when a Fox had been following me for some distance, to ascertain whether these little footpads could be readily frightened away. I commenced by throwing large stones in the direction of the animal, thinking to alarm it, but it merely drew aside to let the missiles pass, and continued to bark at intervals, as before. Finally I aimed some rather smaller stones directly at the Fox, one of which struck it forcibly on the forehead. The Fox merely drew back a little, and barked defiance, so I desisted, fearing that I might kill the animal, which I had no wish to do." [85]

Even the young have this habit. Nelson says that his "party scaled the precipitous walls of Herald Island and found these Foxes in possession. As we were," he continues, "the first men to reach its summit, and but a single party had touched its shore before us, the Foxes were perfectly

[82] Nat. Hist. Alaska, p. 239.

[83] Priv. Journ., p. 75.

[84] F. B. A., I, p. 87.

[85] Fur Seals, pt. III, p. 348.

unsophisticated. A half-grown young one sat on a huge rock over us as we gained the top, and kept uttering a squeaky bark of protest." [86]

Trevor-Battye's description of a cub that he captured in Siberia might apply word for word to any of our smaller Dogs when of tender age. He says:

"I sketched a little 'psi-itz' or Blue-fox and was much amused at the way it behaved to the Dogs. They quite understood that they must not touch it. But old Ni-arr-way would come up and stand proudly over it with his tail moving slowly, and very stiff, as big Dogs are to a puppy. There the little Fox would lie over on its back and mew in a deprecatory way. Besides this, it made two other sounds—a little snarling grunt for human beings and the regular night-cry of the Fox, not unlike the noise of a bantam who has just laid an egg." [87]

Greely says: "Sept. 22, 1882—Another Fox caught alive by Jens. The one first caught is now quite tame, and does not much mind being handled. When stroked, he makes a purring noise, not unlike that of a Cat. He invariably jumps at one's face when it is brought near to him." [88]

Many Polar travellers say that it sometimes utters a strange cry much like that of a hawk, a gull, or a brent goose. For instance, Captain Lyon writes: "While tenting, we observed a Fox prowling on a hillside, and heard him for several hours afterward in different places, imitating the cry of a brent goose." [89]

As elsewhere stated, all animals that have a voice, have also a song. Just what song the White Fox has for love or war, no one seems yet to have recorded.

My friend, E. Norton of Dover, Me., tells me, however, that his Blue-foxes were uproariously noisy on certain nights in winter, the mating season. So much so, that the neighbours objected, and on this account he had to give up ranching Blue-foxes in the town limits.

### Habits in General

Dr. D. S. Jordan's experience with the Foxes on Pribilof Island shows them to be in some respects even more doglike than already set forth. He writes: "In our visits to certain rookeries of St. Paul, the peculiar rasping cry of these animals as they caught sight of us, soon became a familiar sound. After a few visits to the Reef on St. Paul, a pair of these Foxes

[86] Nat. Hist. Alaska, p. 240.

[87] A. Trevor-Battye: Icebound on Kolguev, 1895, pp. 244–45.

[88] 3 Years, II, p. 4.

[89] Quoted by Richardson: F. B. A., I, p. 87.

regularly followed us about over the parade ground, dogging our footsteps and at times snapping at our heels. The animals are protected from molestation and annoyance in the summer; as a result of this immunity, they grow overbold and impudent."[90]

Even the wild Foxes in the Far North seem of a like mind. As William Morton says: "These Foxes, when they see a man, do not appear to be frightened; they run a little way, and then sit down on their haunches like a Dog, and face the enemy before running off entirely."[91]

Nelson's language is even stronger. He says: "On the Fur Seal Islands, these Foxes are protected to a certain extent, and are impudently familiar. When one walks across the uplands, the Foxes sit by their holes and bark at him, and often follow from place to place, yelping like ill-mannered curs."[92]

In general, however, the White Fox is nocturnal in his habits. He will mope around or lie in the sun, taking little or no interest in life till the sun goes down. Then in the dusk he becomes all alert, and begins to gambol, frolic, hunt, and trot up and down without ceasing, as indeed is the habit of most Foxes. Nor does he rest till the return of daylight or an overgorge of food sets him once more a-lazying. Nevertheless, it is to be noticed that White Fox, White Bear, White Weasel, and white owl, all the snow-folk, indeed, are in some degree active during both day and night. Evidently they learned to be so in the Far North, where there is nothing but day in summer, and nothing but night in winter.

## Trapping

The unfoxiness of the Arctic Fox is very evident when one considers this animal as the trappers' prey. The merest tyro with the poorest kind of trap is a combination quite sufficient to catch in time every White Fox in the neighbourhood.

The pitfall is the chief trap used by the Eskimo, and is as simple as it is ingenious. It consists of a small circular arched hut, built of stones, with a square opening at the top. Over this opening, some thin blades of whalebone are set firmly in the wall at the near end, so as to form an apparently secure footing; at the far end is a bait. A sprinkling of snow adds a final deceptive touch. When the animal attempts to get the bait, the whalebone slats over which it must pass bend downward and drop him into the pit below, which is deep enough to prevent him from jumping out. The

[90] Fur Seals, pt. III, p. 340.

[91] Q. N. A., III, p. 92.

[92] Nat. Hist. Alaska, p. 240.

PLATE LXXXV.—ARCTIC FOX IN SUMMER COAT
Taken at Aylmer Lake, N. W. T., by E. T. Seton, Aug. 18, 1907
The luxuriant herbage of the Arctic region shows to advantage

whalebone immediately springs back, and the trap is ready for another victim.

Yet another used for both Foxes and Wolves is the box-trap of ice-blocks, described in the last section of the "Arctic Wolf."

"The Eskimo trap them with a 'figure-four' deadfall made of logs, stones, or slabs of ice or snow. Steel traps obtained from the fur-traders are also used."[93]

Captain Lyon caught between 80 and 90 in one winter, at the south end of Melville Peninsula. The traps he used "were formed of a small cask having a sliding door like that of a common mousetrap and were baited with oiled meat or blubber." It is hard to imagine a Red-fox or a Wolf being caught in such an obvious trap; yet, says Parry, "The people engaged in watching the trap remarked that no sooner had one of these animals been taken out, and they themselves retired a few yards, than another entered it. So stupid indeed are they in this respect, that, in several instances, those which had escaped from the ships entered and were recaught in the same traps as before."[94]

Not infrequently, Foxes would venture on board the icebound vessels in winter and be caught in traps set for them on deck; on the same principle, perhaps, that many starving Russians in the late war surrendered, because it gave them a chance of being fed.

"Besides taking a trap so freely, they are otherwise so simple, that I have seen them shot offhand while feeding, the same as sparrows in a heap of chaff, sometimes two or three at a shot. This sport is always most successful in moonlight nights; for in the daytime they generally keep in their holes among the rocks, and under the hollow ice at highwater mark."[95]

Two other travellers, however, have ascribed to this Fox a good deal of foxiness or craft. These are Fisher and Greely. Both credit him with playing 'Possum when it seems the wisest course.

Fisher's note runs as follows: Oct., 1819, "Friday, 29th—A Fox was caught last night in a trap set by the *Griper;* he is perfectly white and is about the same size as the Hares that were killed last month; his long, bushy tail, indeed, gives him the appearance of being somewhat larger than them: but as his dimensions will most likely be taken, I shall forebear saying anything more about his size at present. On being caught, he displayed several of the cunning tricks peculiar to his tribe, for when he was taken out

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[93] Nat. Hist. Alaska, p. 240.

[94] 2d Voy., p. 151.

[95] Hearne: Journey, p. 364.

of the trap, he shut his eyes, and lay motionless, no doubt with a view of being taken for dead, so that when those who were around him got careless, he might watch an opportunity of getting off. Such an artifice might, and very probably does, enable these animals to escape from the Bears and Wolves occasionally; with his present captors, however, his wily tricks have little chance of affording him an opportunity of effecting his escape. He is not hurt in any way, for he was caught in an empty cask with a slide in one end of it, which fell and shut him up in it immediately he laid hold of the bait within."[96]

Greely's note is of similar tenor. He says: "Biederbick shot a Fox the other day, but, neglecting to load his gun at once, lost him, as the Fox was playing 'Possum. He was much chagrined to have Reynard jump up and run on his near approach."[97]

These Ellesmere Land Foxes seem unusually keen, for Greely says:

"He is much more wary and cunning than his brethren of the same species a few degrees of latitude to the south. It was very rare that a hunter could get within gunshot, and poisoned meat was so carefully rejected that, despite frequent baits, only one was obtained in that manner."[98]

## Tamability

This simple-minded, light-hearted Robin Goodfellow of the snow is by far the most tamable of his family.

"If taken young, they are easily domesticated in some degree; but I never saw one that was fond of being caressed; and they are always impatient of confinement."[99]

"Although the rage of a newly caught Fox is quite ungovernable, yet it very rarely happened that, on two being put together, they quarrelled. A confinement of even a few hours often sufficed to quiet these creatures; and some instances occurred of their being perfectly tame, although timid, from the first moment of their captivity. On the other hand, there were some which, after months of coaxing, never became more tractable. These, we supposed, were old ones."[100]

A specimen captured by Doctor Fisher is thus recorded:

"He became daily more domesticated, and was latterly so tame that a person might handle him with great freedom without running any danger

[96] Voy. Disc., pp. 148–49.

[97] 3 Years, II, p. 3.

[98] As above, p. 366.

[99] Hearne: Journey, p. 365.

[100] Lyon: Priv. Journ., p. 75.

of being bitten; he ate any kind of food that was offered him, but what he chiefly subsisted on was bread and peas."[101]

"Those they captured were easily tamed, seldom attempting to bite, even when first caught, and by wrapping a cloth around the hand, some of them could be taken out of the barrel and held, not offering more resistance than a snap at the cloth."[102] (Morton)

On Oct. 19th, Captain Lyon captured a Dog-fox, of which he says: "He was small and not perfectly white; but his tameness was so remarkable that I could not resolve to kill him, but confined him on deck in a small hutch, with a scope of chain. The little animal astonished us very much by his extraordinary sagacity, for during the first day, finding himself much tormented by being drawn out repeatedly by his chain, he at length, whenever he retreated to his hut, took this carefully up in his mouth, and drew it so completely after him, that no one who valued his fingers would endeavour to take hold of the end attached to the staple."[103]

Greely says of one he held captive: "When caressed, he gave out a purring sound, which we thought to be a sign of pleasure."[104]

Referring to some captive Foxes, Morton is cited by Bachman to the following effect: "They were kept on board the vessels for some days and afterward let loose; they did not always appear very anxious to make their escape from the ships."[105]

But here, as always, in analyzing the mentality of all highly developed animals, we must allow for enormous individual variation. Thus during January, 1822, while at Winter Island, Capt. Geo. F. Lyon captured many White and 2 or 3 Blue-foxes, of which he says: "The great variety of dispositions displayed by those which were kept for taming, was very remarkable, some being gentle and quiet from the time of their first coming on board, and others remaining wild and intractable in spite of every kindness and good treatment. Our Dogs became familiar enough even to play with them; but the Foxes were, on their part, never entirely free from apprehension on this account. The noise they make when irritated is a weak, half-stifled sort of bark, but they have also a more shrill and piercing cry when much frightened."[106]

[101] Voy. Disc., p. 163.

[102] Q. N. A., III, p. 92.

[103] Priv. Journ., p. 64.

[104] 3 Years, II, p. 367.

[105] Q. N. A., III, p. 92, referring to animals taken by crew of the Advance, off Greenland.

[106] Parry's 2d Voy., p. 151.

## His Daily Life

The blizzard wind has blown all day—the short, dark day of the Polar Sea. The little Snow-dog has lain curled up in the hole he dug for himself in a snowdrift. The day before, he had slept in a natural cave in the ice, and the day before that, he crawled into a rocky crevice on the high land twenty miles away. Such is life for him in the region of winter; but he carries warm wraps of his own, and, like other Polar explorers, he does not mind the cold so long as he can keep out of the wind and find food.

Now he is hungry. He stretches, yawns elaborately, examines a near-by bump, decorates it with his kidney product, blinks his yellow eyes at a distant ridge, and then sets out at a trot to find a meal. The wind has sunk from a gale to a stiff breeze. He trots off, not with the wind (that would be dangerous), nor against it (that would be hard), but angling so that the slightest whiff of food is sure to reach his wise little nose. In this hard white land, in winter at least, the source of nearly all food is the open water of the sea. The ever-changing edge of the floe ice is the hauling-ground of the Seal and the prowling range of the great Ice-bear. The Bear can kill the Seal, and the little Ice-dog, yapping at a safe distance, can oftentimes rush in and get scraps, trusting to his wingéd heels to avoid the ice-king's wrath; or he can wait till the king has fed and retired, then rush in to a banquet. There are birds to be had also; even in winter, there may be ravens and little auks. These swift creatures capture fish and shrimps in the sea and carry them to the ice to eat; and now is the chance for the little Ice-dog to maraud the marauders. A crafty stalk and sudden dash, and the original pirate has lost his prize to pirate No. 2. Once in a million times he encounters a camp of men that unwittingly enrich the fox-range with the wasted fragments of their destruction. Again, fish and crustaceans of many kinds are sometimes ploughed up by travelling icebergs and tilting ice.

And when kindly old Mother Sea has nothing in her cupboard for her Snow-dog, he can at least head for the nearest land, a trifling thirty white miles away, and here, in sheltered valleys, nose about for Lemmings. Plentiful indeed are these Snow-mice, but usually far down, hard to get at, well protected by a thick, strong sheet of ice and wind-hammered snow. This was the Fox's home range last summer; here he may yet find a ptarmigan, or get some Snow-mice. He can certainly get some birch and willow browse, and twigs to fill his small belly, and keep those hot little millstones, the stomach-walls, from grinding

each other in their idleness. But—and this was most likely the main impulse that brought him—here, in the last year's time of plenty, he made many little caches of food, mostly of Snow-mice, but some of Snow-grouse eggs and a dried-up corpse or two; for if the pinch of dire famine be on him, even musty feathers have their charm. A score of these caches he may have made, each one of which may contain two or three square meals; and two or three square meals a week are, as is well known, all that any one needs unless that one chance to be a besotted, three-meals-a-day sybarite, and for such the Polar islands are no place.

First our Snow-dog sets about finding the blessed spot. Not an easy matter, indeed, for the landscape has changed, and the cache is buried deep. But he knows his own range, his memory gives him general guidance; and the protometric record at the spot has not been entirely washed away.

Yes, surely this is it; and he digs with all the energy of his famine-driven frame. Down, down, he goes. The upper snow yields easily; then comes the lower and harder snow; at last he reaches the frozen ground which needs both tooth and claw to penetrate it. But there is no longer any doubt that he has found the spot. He digs more eagerly than ever, and with watering chops; for already the sweet, luscious Snow-mice are within smell-reach.

But now, buried though he be, his exquisitely sensitive ears give warning of a faint, far snow-craunch. Instantly he is out of his hole and on the alert; for these are parlous times, and there are both Bears and Wolves on this high island. But luck is with him. Neither monster is near. Here, gazing at him, not many hops away is—another Fox—a Snow-dog like himself—and hungry too; for snow and hunger are interchangeable terms in the Far North. But property is property, and the first little Snow-dog needs all he has or can get; so he curls up his tiny black snout, wrinkles his snow-white visage, and shows in their red setting a double row of ivory teeth. Then through them sends the harshest rumblingest growl at his command—a plain intimation to No. 2, "You are a trespasser, a burglar, a bandit; and if you come nearer, you shall pay an awful price."

No. 2, a walking snow-bump like himself, approaches slowly, and both circle so as to get each the other's wind. Then No. 1, still angry and masterful in his righteous indignation, gets proof that No. 2 is an old acquaintance, a friend. Still nearer they approach, No. 2 droops low the tail, raises its base a little, and flings on the wind the odour-musk from the caudal gland, that is the identification disc of their race. No. 1 now does the same, for that is law. Each grins a friendly grin, and slowly, but at last completely, each recognizes the other as a mate. Male and female they

are—husband and wife. Far apart they have drifted since the happy summer days they spent together in this valley, but now are brought together again by their common knowledge and their common need.

However, the question of the cache is still before them. It may be common property, but most likely it was made by the little he-Dog, for he went direct to it. Anyway, he warns her back, and keeps on digging till the pile of frozen Lemmings is unearthed, still fresh and good, for last summer he had packed them well on ice. He had dug down to the frozen earth, and the Lemmings have lain on it, hard frozen ever since. So he feasts gloriously upon them, and when he has half done, he allows his mate to shoulder in beside him and finish what is left.

Now both are full and happy. They can go a week, if need be, without further sustenance, but their energy, hardihood, and optimism will surely lead them to other foods before they suffer much from the hunger-pinch.

After this, they drift apart again; and in some hole he knew of old, or has found new-made by the accident of frost, our Snow-dog settles to rest muffling his nose and paws in his huge warm tail, leaving only his sentinel ears to stand a-cock above this rounded mass of living snow. But that is enough, for it is a physical impossibility to come unawares on one of these creatures asleep, so exquisitely attuned are their keen ears to every sound, however slight, that comes within the danger zone.

The frost may intensify to 60° below, the wind may rise to 60 miles above—but he curls up happily to sleep. "Fate cannot harm him—he has dined to-day."

One naturally asks, why, if the Foxes have their food caches, do they not stay near by and live on them, as do Squirrels and other provident creatures.

The answer seems to be that the caches are made in summer when food abounds. In early winter, food still abounds, and the Snow-dogs are lured on and far away by the joys of the chase, by the lure of life and travel. Sometimes it is likely they forget the place of the cache; doubtless, many of their stores are found and stolen by Bears and Wolves. Foxes have some respect for each other's property when marked as already described; but a starving Fox will hold to the more ancient rule that self-preservation is nature's first law, and will eat when a chance turns up, as surely as will a starving man. So that, though the cache is a good thing when it can be made and carried over, it is subject to too many risks to be relied on for support without continual hunting.

A hundred Arctic explorers have summered and wintered with the White Fox, and all present more or less delightful pictures of this cheerful

little simpleton making his merry best of the hardest life that well can be imagined. His nose, of course, is his safest, his wonderful guide. Its high-strung sensitivity can analyze the countless wireless messages on the wind, and tell him of meals, possible or promised, many miles away.

This explains why a vessel, wintering in the Polar ice, quickly becomes a centre of attraction to many Polar Foxes. Let the south wind blow for twenty-four hours, and down from the north, their analytic noses in the wind, come capering and drifting these merry Snow-dogs. The west wind blows and the east contributes more of their pure white blowsy forms, invisible in their spotless purity, till yellow eyes and coal-black noses appear from nowhere on the nearby snow.

Thereafter they hang about the vessel, for it yields them scraps of food. So also, in the far Northwest, they haunt the traders' houses. Full of promising odours is the air around these outposts night and day; overpowering is their allurement to a Snow-child that may have had only one meal a week for long past.

But around both ships and trading posts there are dangers too; dangers multiplied indeed to the measure of their promise. Men, guns, traps are there, and worse, a pack of hostile Dogs. But courage is a winner, and the White Fox, taking his life in his teeth, sneaks, like a moving snow-bump, into this devil-guarded Eden. And oftentimes he wins, but sometimes fails; and those who love a brave adventurer will read this story of a failure—read, but read with sorrow. Yet they should read, for it will establish firmly this north-wind optimist in the hearts of all who love a brave little heart. This is the tale as it was told me by my friend, Nelson, the naturalist.

### The End of a Small White Hero

While he was living at St. Michael's, Alaska, he says, in the depths of a hard and snowy winter, a foraging White Fox came up by way of a high snowdrift to the warehouse roof, and looked down into the courtyard below, where, lounging about, were a large number of Dogs. Some of these spied the intruder. He made off, but, after a chase of a couple of hundred yards through the deep snow, was overtaken by a big long-legged white Dog. The moment the pursuer came up, the Fox threw himself upon his back and held up his paws as if to play. Oh, clever dodge! does not a puppy disarm a hostile Dog by just such complete submission and appeal? The big Dog stopped short in amazement, accepted the friendly overture, and then began to frisk about as if in play with another Dog. A moment later, the rest of the yelping pack came up, and excited by their cries, the first Dog forgot his

better nature, broke the truce, and treacherously tried to seize the Fox. But the Snow-child caught his foe by the end of the nose with such a grip that the big Dog, utterly discomfited, retreated toward the houses, howling dolefully, and dragging his plucky little antagonist with him. It was only when near the houses, right in their own camp with all kinds of support, that the other Dogs succeeded in tearing loose the Fox—yes, dragged him off—but he took with him part of the enemy's nose and lip. Then the howling mob closed in. A few seconds later, the heroic little Snow-fox died in the midst of his enemies, bravely fighting, but overwhelmed by a score of Dogs, any one of which was three times as big as himself.

Do not forget it, reader, for the story is true; true in detail and true as a big parable. And the next time you see, or wear, the pelt of an Arctic Fox, it would not be amiss to hope that you yourself may meet hard life, or grim death, with fortitude as unflinching as that of this cheerful child of the snow.

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## Common Red-fox, American Red-fox, Red-fox, Reynard, Cross Fox, Silver-fox, Black Fox

*Vulpes fulva* (Desmarest)

(L. *Vulpes*, a Fox; L. *fulva*, yellow; because it is yellow compared with the Red-fox of Europe.)

*Canis fulva* Desmarest, 1820. Mammalogie, I, p. 203.
*Vulpes fulvus* DeKay, 1842. Zoöl. of New York, Mamm., p. 44.

Type Locality—Virginia.

French Canadian, *Renard.*
Cree, *Wah-kus'.*
Ojibwa and Sauteaux, *Wah-gush'.*
Chipewyan, *Nak-ee'-they.*
Ogallala Sioux, *Shung-ka-ge'-lah.*
Yankton Sioux, *Song-kee'-na.*

The genus *Vulpes* (Brisson, 1762) comprises dog-like animals of small size, with long, bushy tails (more than half the length of the body); long, soft fur; long, sharp muzzle; large ears; long, sharp, semi-retractile claws; linear eye-pupils; and teeth as follows:

$$\text{Inc. } \frac{3-3}{3-3}\text{; can. } \frac{1-1}{1-1}\text{; prem. } \frac{4-4}{4-4}\text{; mol. } \frac{2-2}{3-3} = 42$$

The number is the same as in *Canis*, but they are different in detail, as well as much more slender in general.

In addition to these generic characters, the American Red-fox has the following:

*Size.* Length, about 40 in. (1016 mm.); tail, 12½ in. (318 mm.); hind-foot, 7 in. (178 mm.). The ♀'s are about one tenth smaller.

*Weight.* An adult taken at Carberry, Manitoba, Oct. 27, 1884, weighed 10 lbs. An adult ♂ is given by Bachman at 14 lbs.[1]

DeKay says a large ♂ "weighed 11 lbs., and I have heard of others weighing 15 lbs., but such are not common. The largest I ever heard of was

[1] Q. N. A., I, p. 46.

a ♂ on the fur-ranch of E. Norton at Dover, Me., it weighed 16¾ lbs.: the usual weight is from 8 to 10 lbs."[2]

This shows our Fox to be much smaller than the British Fox. The latter, according to J. G. Millais, weighs, ♂'s 15 to 20 lbs., ♀'s 10 to 15 lbs. The largest ♂ he ever saw turned the scales at 24 lbs.; 29 lbs. being the record for this species in Wales.[3] Yet Nelson thinks Alaska Foxes probably the largest in the world.[4]

*Colour.* When seen at a distance our Red-fox looks like a large golden-red animal in black boots, with black ears, and with an enormous tail that is white-tipped. On closer view, the golden-red turns out to be the play of a multitude of exquisite autumn tints. On muzzle, neck, and shoulder it is a deep, tawny orange; on back and rump, it shades into a sort of grizzling or speckling of dull white and reddish brown that looks almost pink in some lights. These back colours melt into a lovely golden brown on flanks, rump, and tail. But the tail is washed over with reddish brown sprinkled with black, and ends always in a *big white tip*, even when the animal is a melano. The ears inside, cheeks, throat, and under parts are white. In most, the belly is tinged with very dark gray. The back of the ears and upper part of each foot and leg are black.

This is, indeed, a flat enumeration of its flat tints, but gives no conception of the marvellous colour beauties of its exquisitely blended tawny pinks, russets, and yellow-browns, set off by the old gold, dull silver, and shining ebony of its extremities.

*Freaks.* Black, Silver (*i. e.*, black, frosted over with white) and Cross Foxes are well-known colour variations in this species; these forms are mere colour freaks and may be found in the same brood with those of ordinary colour.

A notable example of this is given by A. P. Low in his "Mammals of Labrador," as follows:

"On the Moose River, in 1887, the writer found a litter containing 7 Kits: of these 2 were Red, 3 were Cross, and the remaining 2 Blacks or Silver—thus showing that the colour of Foxes no more constitutes varieties than does the difference of colour in a litter of kittens of the common Cat. There appears to be a greater proportion of dark-coloured Foxes in the northern region than in the southern."[5]

The Cross Fox, according to a current belief, gets its name from the assumption that it is a cross between the Red and Silver-black Foxes, but

[2]Nat. Hist. N. Y., I, p. 44.

[3]Mamm. Gt. Br. & Ire., I, p. 202.

[4]W. A. N. A., p. 417.

[5]Mamm. Lab. Penin., Can. Geol. Surv., 1896, p. 314L.

it seems that the adjective really refers to the dark cross on its shoulders. Richardson speaks of its "cruciform markings";[6] and Gesner named it *crucigera*. Bachman gives it "a cross on the neck and shoulders . . . black";[7] and other writers make similar allusions.

Another freak is the "scorched" or "Samson Fox." This has no long fur, nothing but wool; the cause of this is not understood, and the pelt is worthless commercially.

### Races

The following forms have been recognized:

*fulva* Desmarest, the typical form from Virginia.

*macrourus* Baird. Much like *fulva*, but with *tail much longer*, and black on legs less extensive. T. l., Wahsatch Mountains, bordering Great Salt Lake, Utah.

*necator* Merriam. Much like *fulva*, but cranially related to *macrourus*. T. l., Whitney Meadows, near Mount Whitney, Cal.

*cascadensis* Merriam. A short-tailed, small-toothed Fox, much like *fulva*. In red pelage, like a small edition of *regalis*. T. l., Trout Lake, south base of Mount Adams, Wash.

*rubricosa* Bangs. Larger than *fulva*. Colour deepest and darkest of all. T. l., Digby, N. S.

*bangsi* Merriam. Like *fulva*, but ears smaller. Less black on ears and feet. T. l., L'anse (Lance) au Loup, Strait of Belle Isle, Labrador.

*deletrix* Bangs. Like *rubricosa*, but very pale straw colour. No black basal spot on tail. T. l., Bay St. George, Newfoundland.

*alascensis* Merriam. A large, coarse-haired, yellow Fox. Near kin to the *V. vulpes* of Siberia and Scandinavia. Tail very long. T. l., Andreafski, Alaska.

*abietorum* Merriam. Skull like that of *alascensis*, but slenderer. Appearance unknown. T. l., Stuart Lake, B. C.

*kenaiensis* Merriam. Large. Skull, long and slender. Appearance unknown. T. l., Kenai Peninsula.

*harrimani* Merriam. Large. Tail enormous. A curious mane on neck. T. l., Kadiak Island, Alaska.

*regalis* Merriam. Largest and palest of all. Tail very long. T. l., Elk River, Sherburn County, Minn.

[6] F. B. A., I, p. 94. [7] Q. N. A., I, p. 45.

### Range with Map

There are few animals in America with a wider range than the Red-fox group. It is generally dispersed in wooded regions of America from Atlantic to Pacific in a wide belt that is bordered on the north by the Arctic region and on the south by a line that is nearly on N. lat. 35°.

This is one of those species that have kept pace so completely with the times that it is extending its range, and probably increasing in number.

### Importations from Europe

At one time the Red-fox was exceedingly rare in the Eastern States, if not entirely absent. This has given rise to the report that it is not an American species, but a European introduction specially brought by fox-hunting enthusiasts. But we are confronted by the fact that the Fox has always been found in the North and Northwest. Here is some of the testimony:

"In earlier colonial times," says Rhoads, the Red-fox was "unknown in the austral zone, its primitive distribution being greatly altered by its introduction into austral habitat by fox-hunting man and by the altered environment of our lowlands. Owing to the importation of European Red-foxes into this country in early colonial times, our east American Red-fox is probably a mongrel species to that extent, claiming as we do that there was originally a specific difference between the two. . . .

"Kalm in his 'Travels', vol. I, 1770, p. 283, says 'the Red-foxes are very scarce here [Pa. & N. J.]; they are entirely the same with the European sort.' He further states that Bartram, of Philadelphia, told him the Indians were unanimous in saying the Red-fox was never in the country before the Europeans. In a discussion of the identity of the American and European Red-foxes in 'Doughty's Cabinet of Natural History,' 1830,vol. I, pp. 28, 29, there occurs the following significant allusion to the former absence of the Red-fox in Perry County, Pa.: 'In 1787, when quite a boy, I was at the death of the first Red-fox in Perry County, Pa. Not a person present, nor any who saw it for some days, had ever seen or heard of an animal of the kind. At last it was shown to a Mr. Lenarton, an old Jerseyman, who pronounced it an English Fox. He said the Red-fox was imported into New York from England by one of the first English governors, who was said to be a great sportsman, and turned out on Long Island, where they remained for many years, but at last made their way on the ice to the mainland and spread over the country.'"[8]

[8]Mamm. Penn. & N. J., pp. 145–46.

PLATE LXXXVI.—PHOTOGRAPHS OF RED FOXES
By E. T. Seton

as yet been no remains of the Red-fox detected among the fossils derived from the Carlisle and other bone caves. The Gray-fox is abundantly represented, but not a trace of the other. This would almost give colour to the impression, somewhat prevalent, that the Red-fox of eastern America is the descendant of individuals of the European Red-fox imported many years ago, and allowed to run wild and overspread the country."[11]

Reference to the older travellers implies that the Red-fox was unknown in all the wooded sections of America. Alex. Henry, writing about 1800, records it but once,[12] and then in prairie country (Manitoba). Long does not mention it in his journey across the Plains up the Platte to the mountains, and back down the Arkansas in 1819–20. Carver's Minnesota record is too vague to be of service. Richardson, however, in 1829, calls it "very plentiful in the wooded districts of the fur countries."[13] After this, it seems to be reported generally abundant.

This then is the broad conclusion imposed by the evidence: A Red-fox was native to America north of lat. 40° or 45°, but was scarce in the unbroken forest. The European Red-fox was introduced into the region, including Virginia, about 1750. It has mixed with the native Red-fox and the offspring spread and increased through the forest region as it was opened up, until now their descendants are found in places south to latitude 32°.

## Home Range

The home locality of the individual Fox is, I think, not more than 5 miles across. Ordinarily, it does not range so far, but, under unusual stress of famine, will cover even a larger area. The evidence is that, when pursued by Dogs, the Fox usually circles at a radius of 2 or 3 miles, differing, of course, with the character of the country; also that a number of well-known Foxes, such as the "Mahogany Fox" of Hartford, Conn., "Baldy" of Berkeley, Va., and the Black Fox of Blacktail Creek, Wyo., were known and watched for one or more years and usually found within 3 or 4 miles of their reputed headquarters.

Since writing the above, E. Norton, a well-known fox-breeder of Dover, Me., has given me the following corroborative information.

In March of 1885, he and his brother went out near Dover with their fox-hounds, hoping to run a she-Fox to earth and dig her out for a breeder. They soon had one holed up, but were disappointed to find it a dog-Fox in half-shed coat; he was not worth skinning, so they cut the top off one ear and

[11] Pac. R. R. Rep. Mamm., 1857, p. 130.

[12] Journ., p. 108. See Lynx References.

[13] F. B. A., I, p. 91.

slit the other, then turned him loose. Five years afterward he was killed within 4 miles of where first they had caught him.

At Green Lake, Ont., was a Silver Fox that ranged there for a couple of years. My informant, George Linklater, says it covered 10 miles, or not more than 15, of country, and was there the year round.

The habits of the English Fox affirm this. All the keepers and hunters that I have consulted believe that a Fox rarely goes more than 4 or 5 miles from home, except when hunted.

But in the winter it roams over an extent of country probably two or three times as large as its summer range. A Black Fox that lived on the "Big Plain," Man., was seen about Carberry as far north as Petrel, 9 miles, and south to the Sandhills, 4 miles. There is no certainty that it was the same Fox, but when one was killed at Petrel it also disappeared at Carberry, and if it had lived only about Carberry, it would have been seen oftener. This seems to give it a winter range of at least a dozen miles in diameter.

Joseph M. Dohan of Philadelphia writes me: "I have known such [a strongly marked] Fox to live in the same district for four or more years. Of course, they are frequently moved by farmers or boys interfering with the earths."[14]

## Numbers

Much observation and many calculations incline me to believe that 20 per cent. drain per annum is all that most animals can stand and keep up their numbers. Especially is this true of Foxes. So that, knowing the annual toll of the trapper, and the fact of unchanged abundance, we can make a fair guess at the minimum total population.

In 1921–22, according to the Government Report, 2,943 Fox pelts were marketed from the Province of Manitoba with its land surface of 230,000 square miles. These pelts presuppose a kill of at least 6,000 Foxes, and this is not more than 20 per cent. of the total number, since they can stand the drain. Therefore, the Fox population of that Province is probably 30,000, or 1 to 8 square miles, in spite of the fact that $\frac{9}{10}$ of the Province is the uncongenial spruce forest. The small portion remaining being the fat prairie country abounding in the food possibilities of well-stocked farms.

That these figures are not an overestimate will appear on setting the facts side by side with those supplied in the "Old Country."

After consulting many of my hunting friends, I learn that about 11,000 Foxes are killed each year before the hounds in Great Britain; while the destruction by keepers, etc., at least doubles the number destroyed annually

[14] Letter, Sept. 22, 1905.

# Genus Vulpes.

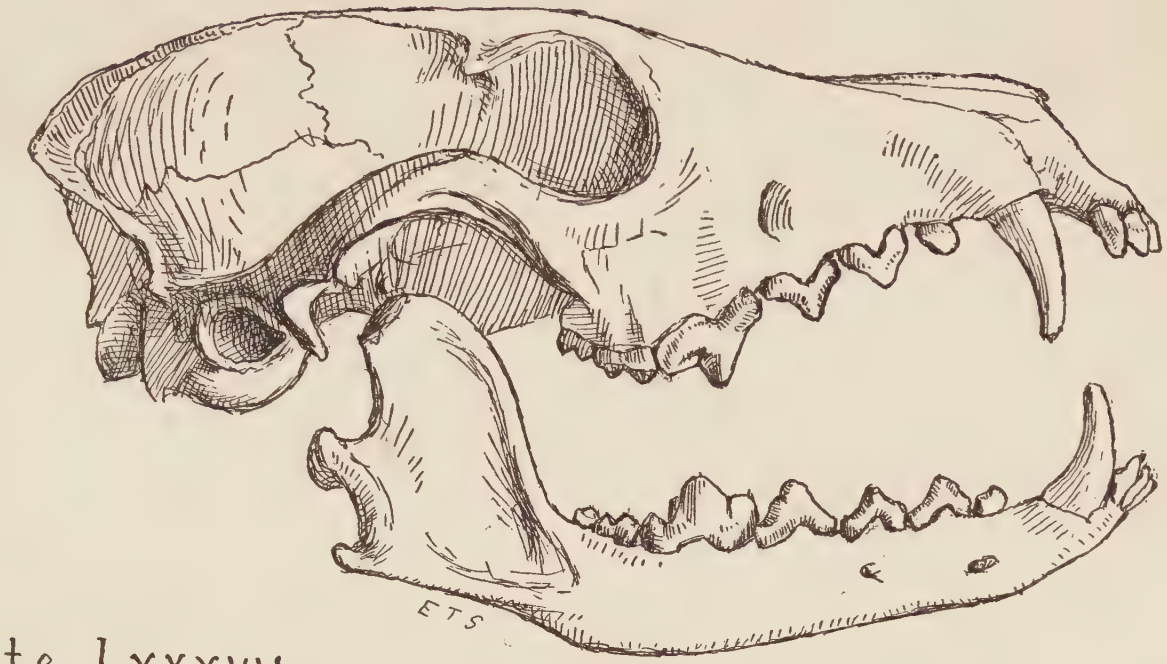


Plate Lxxxvii.

Skull of Red-fox (*fulva*) ♂ ♩ Amer. Mus. 11066

on the 80,000 square miles of the British mainland, and would argue a vulpine population in the autumn of fully 40,000, to compare with the 30,000 that I give as a conservative estimate of the Foxes on Manitoba's much larger range. But of course, the Foxes in England are carefully fostered to abnormal numbers.

The State of Pennsylvania has 45,000 square miles. According to the Pennsylvania Game Commission, bounties were paid on 24,922 Red-foxes killed in the State during the $6\frac{1}{2}$ years between April 15, 1915, and Dec. 31, 1922. The last year 3,525 were reported, and there is apparently no diminution of the Fox numbers. Therefore, there must be a minimum of 20,000 Red-foxes in the State, or 1 to every $2\frac{1}{4}$ square miles.[15]

A still more striking, if less reliable idea, of the Fox numbers on a given range is afforded by the following:

A great fox-hunt operating as a shot-gun drive and surround, by 200 hunters and farmers, was arranged in Burlington County, N. J., during Jan., 1921. The drive started from Knight's Bog and covered about 10 square miles. More than 30 Foxes were killed that day, but scores eluded the hunters. The number of Foxes seemed about the same, so that other hunts were arranged to cover the same ground.[16] If this newspaper report is correct, it implies over half-a-dozen Foxes to the square mile in Jersey, a region especially fitted to feed and protect them.

A. N. Meilinggaard of Greenwich, Conn., gives me the following interesting account of the Fox on his native island, Lessö in the Kattegat, Denmark. Lessö is about 10 by 12 miles, low and sandy, and averages only 8 feet above water level. The inhabitants are Danes, about 1,700 in number, all sailors and farmers. They are confined to the southern third of the island. The northern two thirds is a wilderness of sand dunes and ling wastes—no rock whatever. The only thick cover is a stretch of spruce and birch about a mile long and half a mile wide.

The island is infested with Foxes, which do a great deal of damage to chickens, notwithstanding unremitting persecution and an annual drive covering the whole island. In the annual drive, a dozen or more are taken —either shot or smoked out of their holes—and many others killed during the year. Yet they defy all attempts to exterminate them.

They continue as numerous as ever. No black ones are ever seen. Poison is not used. There are no Rats on this island; often the pests land from ships, but speedily disappear, thanks to the Foxes.

Since my contention is that the Foxes can stand an annual drain of

[15] Seth E. Gordon: Bull. Am. Game Prot. Ass., Jan., 1923, p 10.

[16] Philadelphia Inquirer, Jan. 23, 1921, p. 10.

20 per cent., there are at least 100 Foxes on Lessö, or one to the square mile.

A summing of these cases shows: In England, 1 Fox to every 2 square miles; in Manitoba, 1 Fox to every 8 square miles; in Pennsylvania, 1 to every $2\frac{1}{4}$ square miles; in Lessö 1 to every square mile.

In round numbers, the Red-fox range is 5,000,000 square miles, extending from Atlantic to Pacific, and from the northmost limit of trees to N. lat. 35°, wherever there is wood and water quite unevenly distributed; for complete civilization and unbroken wilderness are equally impossible conditions for the Fox.

If, then, the average be 1 Fox to every 4 square miles, we have not less than 1,000,000 Red-foxes on the range.

The fur returns (given later) show an annual catch of 74,000 Red-foxes with marketable coats. The destruction by other causes such as Lynxes, Wolves, Dogs, eagles, guns, poison, and disease, will surely double this, but their numbers seem to stand the drain, showing this to be not more than 20 per cent. This, I take it, assumes a wild stock of at least 500,000, possibly 1,000,000, on the range covered by the Red-fox group. It may safely be set at 750,000.

## Fur

The first year when the Hudson's Bay Company's operations extended without opposition over all the fur country of British North America was 1821. Therefore, we have complete fur lists beginning then only. In using these lists, one must remember that they give the year of marketing, whereas the furs were taken the year before; also certain returns had two years' catch represented, others but half a year's catch.

During the 85 years, 1821 to 1905 inclusive, the Hudson's Bay Company collected 1,536,420 skins of this species; an average of 18,075 for each year. The lowest was 2,757 in 1826, the highest 52,693 in 1876. The average for 10 years, 1895 to 1905, was 22,671.

Poland's lists show that during the 71 years, 1821 to 1891 inclusive, 3,831,516 skins were taken by the other American companies, an average of 53,965 each year. So that the average annual catch of American Red-foxes for fur is about 74,000.

At the London annual fur sale held by Lampsons', March, 1906, the highest price reached was 41 shillings ($9.84) each for 288 dark skins. First-class skins brought usually from 15 shillings to 30 shillings ($3.60 to $7.20), but inferior skins sold as low as 1 shilling and 2 shillings (24 cents and 48 cents). During the great fur-boom of 1919–20, Red-fox pelts taken in Canada

brought an average price of $22.29; the total number taken in the Dominion was 30,317.[17]

*Cross Fox.* The Cross Fox is the half melanism or partly black freak. At the above sales 3,697 Cross Foxes were sold. The highest price realized was 75 shillings ($18) each for 26 first-class dark skins, but 30 shillings to 35 shillings ($7.20 to $8.40) may be considered ruling prices for first class, from which they graded down to 20 shillings ($4.80) for second class, and 7 shillings ($1.68) to 15 shillings ($3.60) for third class. In 1919–20, the average price of Canadian pelts was $63.81 and the number taken in the Dominion 3,659.[18]

*Silver Fox.* The most valuable fur in the world is doubtless that of the rare and wonderful Sea-otter. A prime skin of this brings $1000 or more. Next to the Sea-otter comes the Black or Silver Fox. This is, of course, simply a superb melanism of the common Red-fox. It is intense black with more or less silvering of the hairs on head and rump, the less silver the higher the value.

Miller Christy sends me the following interesting item: "At the Hudson's Bay Company annual fur sale, held in London, March, 1900, 601 Silver Foxes were sold, bringing an average price each of £50 16s. 1d. ($247), and 3 especially fine pure black skins brought, respectively, £310 ($1,507), £340 ($1,652), and £400 ($1,944); that is, £1,050 or $5,103 for the 3.

The record price for a Black Fox pelt is, according to D. A. Boscowitz, £540 ($2,625), given by Grunwalt, of Paris, in 1889, at C. M. Lampson and Company's sale. During the great boom of Fox-farming (1915–20), $34,000 was paid for one pair of pedigreed Foxes of pure black strain.[19] Such a purchase, however, can scarcely be considered a representative commercial transaction.

At the London annual fur sales, held by Lampsons', March, 1906, 992 Silver Fox skins were sold.

The highest prices realized were £320, £310, £310, £280, £220, £210, £190; that is, $1,555, $1,506, $1,506, $1,360, $1,070, $1,020, $883. These were for skins of unusual size and marvellous beauty. The ordinary run of first-class skins brought only £50 to £80 ($243 to $388), and many Silver Foxes of inferior quality brought only £1 or £2 ($4.80 to $9.60). In the great boom of 1919–20, there were sold 3,931 Canadian Silver Fox pelts at an average price of $246.46.[20]

[17] Govt. Report.

[18] As above.

[19] Silver Fox Farming, U. S. Dept. Agri. Bull. 1151, p. 3.

[20] Govt. Report.

# Genus Vulpes.

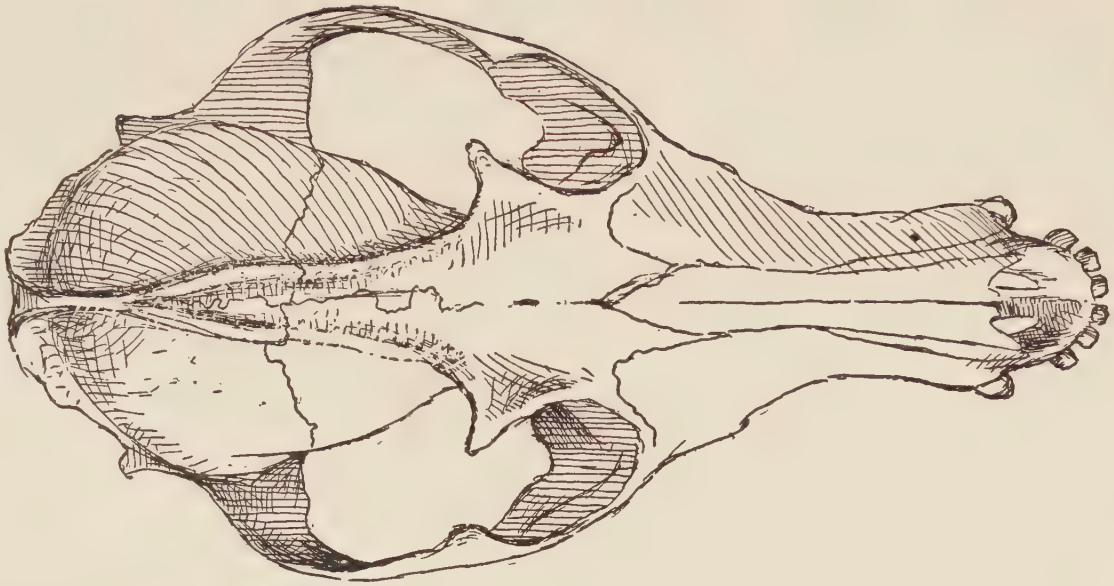

Plate Lxxxviii.

Skull of Red-fox (*fulva*) ♂ ¼ Amer. Mus. 11066.

Lest the frontier trapper who sees the above be led into undue appreciation of his fur, it is well to remember that the fur-dealer has three great risks to face, damage in transport, damage in storage, and, above all, damage through the freaks of fashion. The intrinsic value of Silver Fox as an article of clothing is little more than that of the Red-fox, say $5 or $10 a skin. But Silver Fox is beautiful, rare, and fashionable; hence the fancy prices paid. It is always within the range of possibility that the fashion may suddenly change and the price of choicest skins drop to a fraction of the last ruling figures. The prices paid at the trading posts to-day have been fairly adjusted by keen competition; they certainly are not too low.

The lustre, fulness, and beauty of the Silver Fox fur are unique and inimitable. Its market value is so high that successful attempts are being made to breed Foxes for their pelts. As the subject is of wide interest, I reproduce later an article on Fox-farming which I wrote for *Country Life in America*, in 1905.

### Haunts

The unbroken forest seems as little suited to the Red-fox as is absolute civilization. It is essentially a species of the half-open country, and always increases in the half-settled districts. It was very scarce in the days of primitive woods. I remember very well once in June, 1885, near Coboconk, Ont., seeing a Fox trot out of the woods ahead of me for 50 yards along the path, then disappear without knowing I was near. I mentioned this at a camp I came to in the evening. Two lumbermen were its total population; one had been 16 years in the Muskoka woods, the other a little less, but both said that they had never yet seen a live wild Fox in the country.

Similarly, Bachman says: "This Fox, in times gone by, was comparatively rare in Virginia, and farther south was unknown. It is now [1849] seldom or never to be met with beyond Kentucky and Tennessee."[21]

Many other writers could be cited to show that in primitive days the Red-fox was rare or even unknown in regions where now it is abundant—a fact that has given rise to the myth that the Red-fox is not a native of America, but a European introduction.

There seem to be two grand tests of a species so widely dispersed. First, can it stand the winter in the North; second, can it stand the insects in the South? The Fox has solved the first riddle. Its ideal home and surroundings, its centre of abundance, is the great varied farming region of southern New England, New York, Pennsylvania, New Jersey, Maryland, southern Ontario, and Michigan. Here are man-made supplies for winter

[21] Q. N. A., II 264.

stores, fences enough to bother the Dogs and riders, broken country for cover, and dangers enough to serve as tonic and a source of exhilarating exercise and amusement. In this region the Fox is abundant, to-day probably more so than at any other time of its history—a fact that is illustrated, if not exactly pictured, by the New Jersey hunt already cited.

Let us remember that every part of the fur-country, settled or wild, is more or less covered by the expert trappers. Therefore, the fur-returns are a fair measure of the fur-bearing population. With this in mind, the Canadian Government fur-returns for 1921–22 give us surprising light on the number and haunts of the Fox. In the table the facts are set forth. They show clearly that the greatest number of Foxes are found, not in the largest Provinces, but in those with the largest settled areas, the ratios being:

| | *Sq. Mi. of Total Area* | *Sq. Mi. of Settled Area* |
|---|---|---|
| British Columbia | 1 Fox to 400 sq. mi. | 1 Fox to 2⅞ sq. mi. |
| Manitoba | 1 " " 126 " " | 1 " " 7½ " " |
| Alberta | 1 " " 125 " " | 1 " " 2¼ " " |
| Saskatchewan | 1 " " 83⅓ " " | 1 " " 2 " " |
| Quebec | 1 " " 50 " " | 1 " " 3½ " " |
| Nova Scotia | 1 " " 21 " " | 1 " " 8 " " |
| Ontario | 1 " " 15 " " | 1 " " 2 " " |
| New Brunswick | 1 " " 14 " " | 1 " " 3½ " " |

On this, I have omitted Prince Edward's Island with its 2,000 square miles, all of it cultivated, and its exports of only 38 Foxes, The case is not safe as datum, since they do not market the Foxes, but keep them for the numerous fur-ranches.

## His Love for His Homeland

The tenacity with which the Fox holds to a fat and ancient range in spite of man-danger multiplied to the *n*th degree is remarked by many observers. In 1892 there was a Fox family living in the ravine just north of Bloor Street, Toronto, Ont. They continued there for one or two seasons, although the place was within the city limits and surrounded by houses. They were many times seen. Their location saved them from hunters and guns. Dogs, their only grave danger, they eluded by use of the interminable fences. Going through a hen-hole was an adequate answer to pursuit by big Dogs, and scaling a 6-foot board fence easily baffled any small Dogs. I saw them once or twice, and had plentiful evidence of their cleverness in raiding the surrounding chicken roosts. So far as known, they lived happily for ever after and died of old age.

In my home at Cos Cob, Conn., 1906–12, a pair of Foxes quartered

themselves on my duck preserve. A 10-foot fence kept all Dogs away. There were over 100 acres in the preserve, so the Foxes lived a merry life.

In Milbank Park, 300 acres, in the centre of Greenwich, Conn., a pair of Foxes established themselves and for a time seemed to have every blessing of life in abundance. The owner had great flocks of waterfowl on the ornamental waters, no Dogs were admitted, guns and rifles were unknown. An old Woodchuck den in a rocky ledge supplied a perfect home beyond the reach of pick or shovel.

However, the owner got tired of feeding these poachers on ten-dollar ducks, and showed that, though beyond the possibility of being dug out, the Foxes were not beyond the reach of a stick of dynamite, with one of which he cut short the career of the whole family in their cave.

Around my Greenwich home, only 2 miles from the town, and with a well-be-dogged house every quarter mile, the Foxes abound. I hear them nearly every night or see their traces every morning. Many a duck have they taken from my stock, but I gladly forgive them. It is worth more to me to hear that squalling night-cry under my window in the darkness than to be the overfed owner of many fat, stupid table ducks.

Such experiences incline me to give full credence to the following note: "Some years ago a correspondent sent us a list of the wild creatures to be found within the limits of the city of Boston, and among these, Foxes were named. A recent issue of the *Transcript* of that city says that 7 baby Foxes have been taken from a den on the Newton side of the Charles River below Norumbega Park."[22]

### Non-migratory

Unlike the White Fox, the Red-fox makes no migratory movement, so far as known. The fact that they are much more often seen in fall is due, of course, to the fact that the Fox population is then at its maximum; the families are breaking up and the young are running about in search of the best hunting grounds. Their habits change but little, however, with the changing season.

### The Wild Night-cry

This species uses the smell-telephone much less, I think, than the Wolf does. (See "Wolf.") Its principal method of intercommunication is doubtless by the voice. It has a short bark followed by a little squall like "*yap-yurr*." That is the sound oftenest uttered, but it has also a long yell and two or three different yowls or screeches as well as softer *churr-churrs*

[22] Forest & Stream, May 15, 1909, p. 773.

Plate Lxxxix. Details of ♂ Redfox taken on Great Slave River Alta. 4 Oct. 1907., E.T.S.

that doubtless have different meanings to its kind. The voice of the male is notably heavier and coarser than that of his mate.

In the pairing season the she-Fox utters a very characteristic shrill squall. The reply of the male is usually two or three short barks. In autumn, I have several times known a Fox to come at night around the campfire and "yap" in the manner of a Coyote.

This yapping of the Fox is nearly always at night, but Will W. Christman of Delanson, N. Y., writing to John Burroughs on "The Ways of Foxes," says: "Have you ever heard a Fox bark in the daytime? One winter morning I saw one, a quarter of a mile away, sounding his 'wood-notes wild.' Again, while ploughing last November, I heard one barking about 4 o'clock in the afternoon. One night I heard one barking in the pasture lot. I took my gun and hurried out to interview him. They had been in the habit of crossing the creek about 100 yards from the barn, so I selected this place for our meeting. While getting into position I could hear him barking at intervals, each time a little nearer. There was a few inches of light snow, but no moon, so that it was rather hard to pick out his Foxship from the few small evergreens that grew near the ford. I stood behind a large elm, steadying my gun against the trunk and covering the road I felt sure he would take, perhaps 75 yards away. I did not have to wait. He came out of the protecting evergreens almost as soon as I was ready. It was too dark to take aim, but when I felt sure I had him covered I let go. It was such an unusual time for an ambush that he was undoubtedly the most surprised Fox recorded in these annals. He paused just long enough to locate his enemy and disappeared in the neighbouring woods."[23]

The Fox has, however, one or two remarkable calls for unusual occasions. For example, Bachman says that in one instance some peculiar and startling cries supposed to be uttered by a Cougar were ascertained "to proceed from a Red-fox which was killed in the hunt got up for the purpose of killing the Cougar."[24]

A still more thrilling sound is ascribed to the Fox by Samuel Scoville, Jr., as follows. He and his naturalist companions were prowling in the Barrens of New Jersey one October night. "Suddenly the stillness was broken," he says, "by a perfectly appalling scream. Although I recognized what it was, my muscles jerked and twitched at the sound, and when it was repeated, my companion, even though a veteran naturalist, gripped me so tightly that his finger-prints showed black on my arm the next morning. It was the scream of a Fox, probably the most sinister, unearthly wild-

[23] Forest & Stream, May 25, 1907, p. 811.

[24] Q. N. A., II, p. 312.

animal note that can be heard in North America. The howl of the Wolf and the screech of the Wild-cat, or Bay Lynx, are all weird sounds, to say nothing of the frightful shriek which the horned owl sometimes gives, but none of them begins to be as fearful as the scream of the dog-Fox. Usually he barks like a Dog that is just learning how, and the vixen squalls and squawks like a heron; but none of these sounds can ever be confounded with his scream, as rare and dreadful as that screech of the wounded Horse which frightened even Hawkeye and Chingachgook."[25]

### Why the Great Brush?

No one can long watch a caged Fox in winter time without discerning the use to which it puts its great bushy tail. Its nose and pads are the only exposed parts, and these might easily be frost-bitten when it sleeps during severe weather. But it is always careful on lying down to draw these together, then curl the brush around them; this acts both as wrap and respirator. I have many times seen wild ones do this very thing, and am satisfied that the tail is a necessary of life to the Fox, as well as to the Squirrel and Wolf. I believe a Fox or Coyote would die before spring if turned out in the autumn without a tail.

The brush is large in proportion to the coldness of the climate. In Foxes from the Southern States it is a very meagre thing, but on the Saskatchewan and farther north, it is enormous, looking at a distance almost as large as the Fox's body, and, of course, it reaches its greatest size in the depth of winter. The coat in general is developed by cold, but not apparently to the same extent as the tail.

As elsewhere noted, this useful member serves further as a fender in fighting.

L. W. Walker was in charge of one of the Hotels in Yellowstone Park during the winter, and had ample time to observe the dozen or more Foxes that came for scraps of food. One in particular that they named "Nickle" learned to come regularly to the window for breakfast and supper, responding at once to a whistle or a call by name at any time.

"The other Foxes," he writes, "are familiar with the delicacies with which Mr. Nickle daily gorges himself, and watch him with jealous eyes. Oftentimes Nickle retreats a few yards from the window, to munch his morsel, when, like a streak of light, from behind some convenient snow-bank, springs another of his kind and pounces upon him. Then commences a battle, and a most ludicrous one. After the first jump, they turn their brushes toward each other, open their mouths, showing their teeth, and

[25] Samuel Scoville, Jr.: Fourways, Century Magazine, Sept., 1923, p. 775.

advance snarling, watching carefully over their shoulders, as their rear is turned to the enemy. They make the funniest bounds imaginable; first one way and then the other, as if made of rubber, frisking their brushes in each other's faces, or using them for a guard as a trained pugilist wards off any sudden blow his adversary may deliver. The Foxes quickly turn from rear to front and strike or bite until one or the other is knocked over, and Mr. Nickle saves or relinquishes his bone according as he is more or less adroit than his enemy.

"Since suffering one or two defeats, he has become very cunning, and now eats his lunches so close to the window that the others dare not come to him."[26]

But the brush has also its disadvantage. Dunham Wheeler, of New York, tells me that once while hunting a Fox in the Adirondacks, during early spring, when the snow was deepest and wet, he saw the creature coming toward him; it stopped and seemed to worry its tail; again it did this when nearer. He shot the Fox and found that its tail was heavy with water, and when the crafty one stopped, it had been to wring or stamp out the water with its front paws and so reduce the heavy burden of the water-logged brush.

## Speed

The best speed of an average Fox for 1 mile is at the rate of about 26 miles an hour. This is faster than a Coyote but slower than a Jackrabbit.

A. S. Barton, of Boissevain, Man., sends me an interesting item on this head. "Once," he says, "while mounted on a fast saddle-horse, I ran a Fox for half a mile, both of us doing our best, but it was an even race all the way. I should say the Horse was doing 2-minute time, as his record was 1.51 for the mile." Therefore this Fox was running at the rate of 30 miles an hour. Doubtless it was his highest speed, and he must have been an exceptional Fox.

Bachman, always enthusiastic on wild sport and animal powers, wrote in evident reference to a discussion:

"In order to ascertain whether the speed of the Red-fox was as great in the South as in the colder regions of the North, several gentlemen near Augusta, in the winter of 1844, resolved to test the question by a regular Fox chase. They congregated to the number of 30, with 100 hounds, many of them imported Dogs, and all in fine running order. They started a Fox at 2 o'clock on a moonlight morning. He took to a pretty open country on the west bank of the Savannah River. A number of gentlemen were

[26] Recreation, May, 1897, p. 339.

mounted on fleet Horses. Mr. Beile rode in succession 3 Horses during the chase, 2 of which were good hunters. The pursuit of the flying beast was kept up till 3 o'clock in the afternoon, having continued 13 hours, when the Horses and the whole pack of hounds were broken down, and the hunt was abandoned."[27]

I can hardly forgive Bachman for not adding a triumphant "and thus after running over 100 miles, the wonderful creature made good his escape."

Later on, I give an account of a hunt in which the heroic Fox ran 1½ days without ceasing, virtually destroyed the pack that followed him, and died at the finish with the last survivor of the hounds.

[27] Q. N. A., II, p. 270.

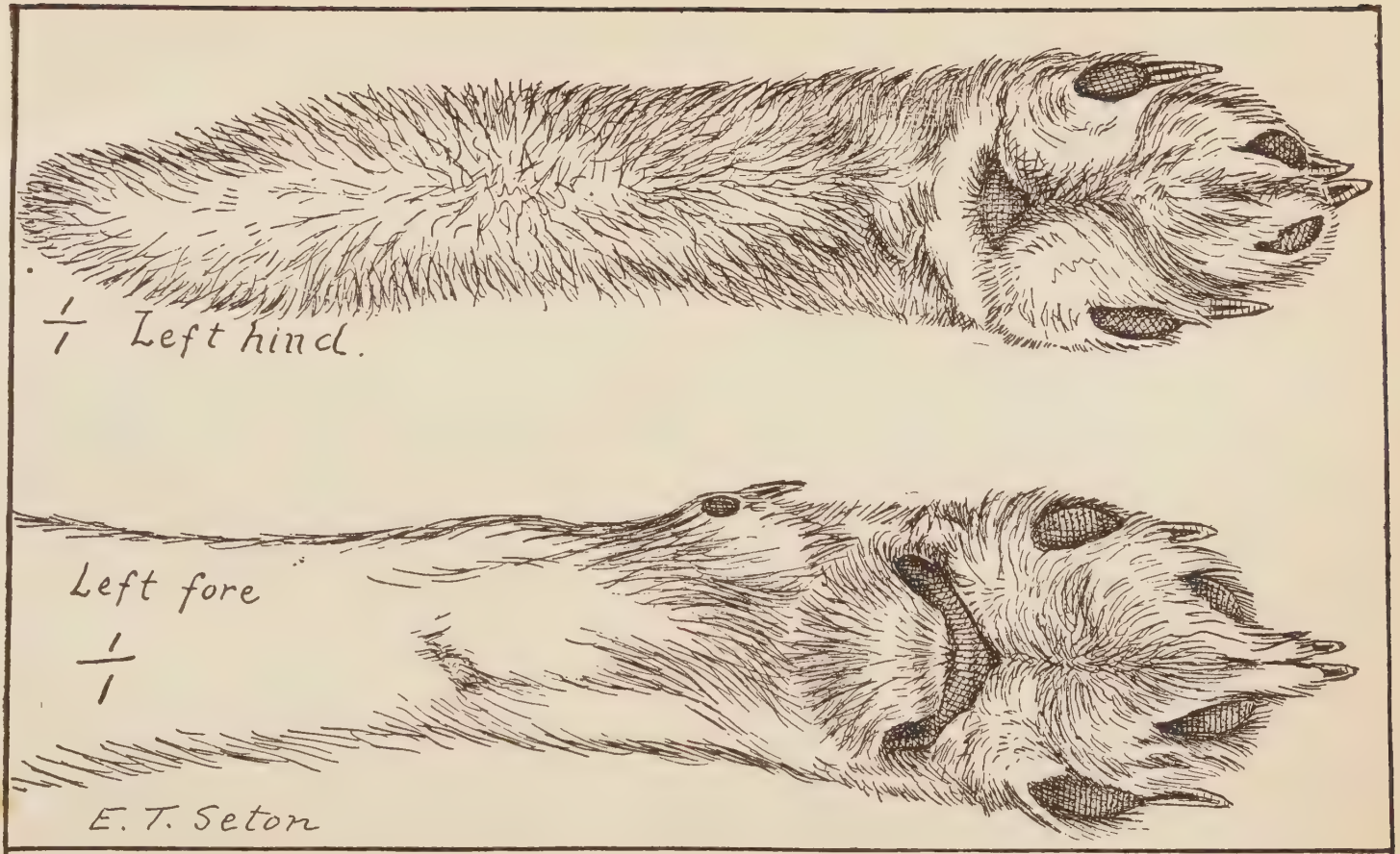


Plate Xc. Feet of Red fox ♂ Great Slave R. Oct. 4, 1907.

## Food

This animal is popularly supposed to subsist on Rabbits, poultry, and game birds. I have known it to kill each of these, but I believe that Mice form the largest part of its diet.

*Mouse-hunting.* The Fox spends so much time catching Mice that he is often seen in the act. Many times, by means of a telescope, I have observed one in broad daylight, while he secured his easy prey. Selecting some well-known Mouse haunt, usually a grassy hollow, he advances quietly, looking this way and that for the slightest rustle, alert to the finest sound, tiptoeing, even standing on his hind legs to see more clearly over the grass. A squeak, or perhaps the movement of the grass-tops, catches his attention and he springs for the root of the long, vibrating spear, slaying with a nip the Mouse that he probably does not see, then separates it later from the grass, to chew and swallow the morsel in a few seconds. His movements are full of elegance and his habits of graceful poses. I know of no prettier sight than a Royal Fox, red and rich in his sleek new coat with its black velvet facings and its trimmings of silver and gold, as he hunts for Mice among the rank foliage and flowers of a prairie-hollow in Manitoba.

A similar scene has been described to me by W. R. Hine. In this case, however, the Fox was not a common yellow one, but a superb silver-black.

In the October of 1887, while out shooting grouse on the Emerson Trail, 2 miles south of Winnipeg, he saw a large Black Fox on the open prairie, some 500 yards away. It was catching Mice, and paid little heed to him as he drove by in a rig with his father and brother. Hine whistled heedlessly and passed the mouser at 100-yard distance, taking care not to go straight toward it. At length its suspicions were aroused and it crouched; although the grass was but 6 inches high, it sank so low that he could see nothing but its black ears. The gunner drove in a circle ever nearer without alarming it, except that the Fox crouched yet lower, and at 50 yards Hine shot him with a charge of heavy shot. Although the time was October, the pelt was already prime.

The squeak of a Mouse has such a charm for the Fox that even a poor imitation made by sucking the back of the hand will bring him at a run toward the squeaker. Though in the midst of a hard run, he will jump at

the sound of a Mouse squeak and, if the Dogs be not too close, will turn for an instant to a statue, then try to locate that sound of sweetest promise.

An excellent illustration of this is found in the remarks of an old fox-hunter (Daphne) who writes from Jersey City, N. J. In discoursing on "Still-hunting Foxes," he says:

"I found the best locality for carrying it on was low-lying fields or pastures, remote from farmhouses. Here at daybreak you would find them hunting catlike for the luckless Mouse, for which they had a greedy appetite. I would place a composition on my boots, which is a great attraction for the Fox, repair to what I know to be a hunting ground for them, walk in a circle on the windward side of some object, a stump, tree, or cluster of bushes, secrete myself there and await the animal's appearance. Sometimes I waited in vain, but a sportsman must have patience and it will prove its own reward. The Fox would strike this trail and follow it past my place of concealment. I have been able on many occasions to call them within a few rods of my hiding place by imitating the sharp squeak of the Mouse. Be careful to have the wind blowing toward you, or else they will scent you and run away.

"I stood as silent as a tree one morning and watched a Fox catch 7 Mice in a few minutes, and at last when near enough I pulled the trigger and the game was mine. When I approached and picked up his lordship, a Mouse dropped from his mouth, and upon examination I found the entire 7 Mice in his mouth."[28]

Another mouse-hunting episode I gladly give, although, unlike the foregoing, it has already been gathered into "book form." This is by W. E. Cram, a field man so keen and original that his product is my ample justification.

"A Fox's ears," he says, "are wonderfully keen, and he depends upon them much more than upon his eyesight, both in hunting and in avoiding his enemies.

"This morning, Jan. 31, 1902, a little before noon, I was crossing an open clayey pasture, when I heard a crow in the distance give the call which means a Fox in sight. Presently I saw Reynard himself trotting along at the edge of a pine grove; when he passed behind a thick clump I ran forward a little way and stopped, watching an opening among the trees where I felt pretty certain he would show himself again. Sure enough, in a very few minutes he appeared and trotted out across the meadows.

"He was at least 150 yards away and going from me, but the air was still and I squeaked like a Meadow-mouse, hoping that perhaps his big ears

[28] Forest & Stream, Aug. 21, 1890, p. 89.

Plate XCI. Fox studies.
by E T Seton.

might catch the sound even at that distance, though the sharpest human ears could scarcely have heard so faint a noise at a tenth part of the distance.

"Yet the Fox heard it and stopped instantly, and turning, came leaping lightly over the hassocks in my direction. Every few rods he stopped, cocking his ears above the sere meadow-grass to listen; then I would squeak, a little lower each time, and instantly catching the direction of the sound, he would come trotting toward me, using greater caution than at first, and keeping under cover of the hassocks as if to avoid frightening his game. When he got within 50 yards there were no more hassocks or bunches of grass for concealment, only the smooth, sheep-trimmed sod where I crouched in plain sight, with my back to what little sun shone through the flecked and mottled clouds that covered the sky. He looked at me sharply as if mistrusting something, and if I had moved either my head or hand the fraction of an inch, he would have been off like an arrow to the woods. But I held myself perfectly motionless, and when the expression of his shrewd gray face and the set of his ears showed that his suspicions were subsiding, I squeaked once more, very faintly, calling him at last almost up to me. But now he saw that there was certainly something wrong, and that I was neither a rock or stump or even an old scarecrow; so, to make sure, he circled around to get the wind of me, trusting more to his nostrils than to his eyesight.

"He was a large male, gray about the face and cheeks, and perfectly black on his legs and the backs of his ears. His tail was a superb white-tipped brush, well grizzled with black. When I spoke to him he sprang into the air and went bounding away to the woods, then stopped and looked back at me for a few seconds before disappearing among the trees."[29]

*A Change of Diet.* Nor are Mice the smallest prey on the Fox's list. Bachman says: "We have watched it catching crickets in an open field near an old stone wall. It is diverting to witness this—the animal leaps about and whirls round so quickly as to be able to put his foot on the insect, and then gets hold of it with his mouth; we did not see him snap at them; his movements reminded us of a kitten playing with a Mouse."[30]

The European Fox has been studied longer and more minutely than ours, and certain remarks on its food habits made by Doctor Brehm may be accepted as foreshadowing observations yet to be made on our own species. "The Fox," he says, "preys on all animals from a young Roe to a beetle, but principally Mice. . . . He catches grasshoppers, maybugs and their grubs, rain-worms, etc., or gathers sweet pears, grapes, or berries."[31]

[29] Am. Anim., pp. 271–72.

[30] Q. N. A., II, p. 268.

[31] Tierleben, Säugethiere, III, 1915, p. 172.

Our ranch-raised Foxes commonly eat bread, biscuit, and fruit, and it comes as a surprise when we find fruit and vegetables listed in the wild Fox's diet.

During my journey through the Far North in 1907, as I came up Athabaska River on October 26th, the dung of Coyotes was full of seeds of berries, as also was that of the Foxes.

Robert C. Murphy, of the American Museum of Nat. History, sends me the following. He knew of "a Fox which was killed by an automobile on Long Island in August, 1920. Its body was very distended, and, when it was cut open, a purple mass of blueberries, apparently quarts of them, gushed out! On the sand-pits, during beach-plum season, Fox tracks can often be found, winding in and out among the shrubs, and the Naturalist suspects that Foxes are no less fond of this native fruit than his own shepherd Dog has always proved herself to be."[32]

One way in which the Red-one may get a sufficiency of vegetable food is suggested by this incident:

On Jan. 21, 1920, I followed a large Fox through my Greenwich woods, where he had been hunting in leisurely fashion. On coming to a high stone wall, he had leaped up on it, and there dropped dung. The four pellets were rather small, soft, smooth, and of a dull green colour, but there was no sign of fruit or hair on the outside. I sent the mass to the Biological Survey for examination and received the following report: "The pellets were composed of about 90 per cent. Mouse fur, mainly of *Microtus pennsylvanicus*. There were a few bones of the Mice, one small feather of a bird, probably a chicken, and some skin and seeds of apples. The green colour over the outside and to some extent throughout the felted mass is undoubtedly from the stomach contents of the *Microtus*, which would be mainly grass. I should think from the amount of fur, that 10 or a dozen Mice were represented in this lot." As there was about two feet of snow on the level, one wonders how he got at the Mice.

### Farmer *vs.* Fox

While I pose as judge of the Fox's case, and pretend to balance fairly the evidence for and against him in the famous legal action *Farmer* vs. *Fox*, I must confess to a strong desire to exonerate the culprit at the bar, to secure by any means his acquittal. For I have known him all my life, and learned to love him; and I have known the farmer all my life, and do not love him. Even when the Fox was stealing all my ducks, I only shook my finger at him

[32] N. Y. Evening Post, Nov. 11, 1920.

and said I must lock up my ducks nights—which did not help much, for the Fox learned my ways and adopted daytime tactics to meet them.

I am stressing hard all the bug-eating, mouse-eating, grass-eating propensities he manifests, and soft-pedalling his positive destruction of stock and game. Yet for the looks of it, I must record some of the damning evidence.

E. P. Robinson, of Packer, Conn., testifies: "One of my Fox-hunting acquaintances who tracked a Fox for some miles on a recent fresh snow to his burrow and dug him out, says he caught and ate 4 ruffed grouse during this short trip. On questioning him carefully, he could not be certain all 4 were caught on this trip, but had thought so at the time, yet admitted that the Fox might have caught and hid one or more of them on a previous night. Five or 6 pounds of partridge would be quite heavy feeding for even a large Fox, I would say, and of a grade not indulged in very freely by some men of fortune. This man's experience is in accord with my own, as I have often seen where Foxes have caught quail, grouse, and Rabbits, but some hunters think Foxes not very destructive of our game birds and animals."[33]

As an offset to this, "Stanstead" [N. P. Leach of Swanton, Vt.], an old fox-hunter, states: "I have hunted Foxes for nearly threescore years, and have yet to see where they have ever caught or killed a domestic fowl or a ruffed grouse, or young lamb; though I have in the winter often seen where they have tried to catch grouse that were roosting under the snow, but never saw where they had succeeded in catching one. I have very often seen where they have caught our common northern Hare, and only once have I ever seen them in the vicinity of the numerous flocks of geese and turkeys that are roaming about our fields."[34]

However, Joseph S. Osborne, of East Hampton, N. Y., writes me: "A neighbour of mine was driving with her husband from an outlying village to their place, in the morning, July 3, 1910, when they noticed running along the road, through the small wood or bushes, some animal of a yellowish colour, and thought at first to be a Dog, but later proved to be a Fox. The creature at first seemed to have a large head, and was hence thought to be a Dog, until, on nearer approach, it dropped 3 chickens from its mouth and ran into the bushes. The chickens were, perhaps, 6 weeks old, at a guess, and were, of course, dead. After the wagon and occupants passed, the Fox came out to the road, gathered its prey again, and disappeared once more."

Now lest our farmers score a point here, let me quote again from Cram. "It is only recently that I have come to realize what persistent Woodchuck

[33] Forest & Stream, Feb. 24, 1912, p. 239.

[34] As above, Sept. 1, 1906, p. 333.

PLATE XCII.—FOX STALKING A RABBIT
By E. T. Seton, 1897
From drawing loaned by New York Zoological Society

hunters Foxes really are. I find that the shrill alarm cry of the Woodchuck, heard echoing back and forth across the pasture-land, is a pretty reliable foretelling of the approach of a Fox.

"The appearance of a man or Dog causes no such general alarm among them."[35]

B. H. Warren has collected much data concerning Fox food in Pennsylvania, and writes: "Mr. J. E. Hodel, of Allegheny County, says that he and James Henderson blamed a Fox for stealing their poultry; they sought for her den and dug her out. It was an old she-Fox, and they found several bushels of bones of lambs, Pigs, ducks, geese, turkeys in an ante-chamber or dining room, by side of den.

"Mr. Geo. Murphy, farmer, Armstrong County, tells me that several years ago, a drover with Sheep and lambs was passing his place, and the lambs gave out and were left there a day; during that time a large Fox paid them a visit, caught and killed one, and then perched itself on the fence to bask in the sunshine. He went to get a gun to kill it, but when he came back it had taken its prey and left. Not long after a sow had a litter of Pigs in the woods; he heard them making a noise one day, and went to see what was the matter. A big fight was on between the old sow and the Fox; the Fox would run at the sow like a Dog, and then the sow would run at the Fox to drive it away from the Pigs that were huddled in the nest; this was repeated several times until the Fox got the sow real mad and she made at the Fox and ran it several yards from the Pigs. The Fox then, quick as speed would let it, bounded round the sow into the nest, grabbed a Pig in its mouth and was gone before the sow could get back to the nest. He had to take the sow and Pigs home to keep the rest from being stolen."[36]

But he credits the Fox with power and turpitude to prey on much more important animals, as follows: "The fact that they will kill young fawns is beyond dispute and shows that the doe has in the artful Fox, as well as in the sneaking Wild-cat, foes which need constant watching. If it was customary for crafty and sagacious Foxes to hunt in packs, as Wolves do, there unquestionably would be a much greater paucity of Virginia Deer than at present exists in Pennsylvania. I have in my museum a Blackbear, about as big as a large House-cat, which was obtained from a woodsman who said he found it at a Red-fox's den."[37]

A final note, a fair summing up, is offered by Dr. A. K. Fisher as follows: "The Fox, from its occasional misdeeds, is looked upon by the majority

[35] Am. Anim., p. 267.

[36] Enemies of Poultry, p. 384.

[37] As above, p. 381.

of mankind as a deep-dyed villain that devotes its entire life to robbery, and derives all its forage from the chicken yard or duck pen. As a matter of fact, even in localities where Foxes are abundant, it is comparatively rare that poultry is destroyed by them. On all well-regulated farms, chickens are housed at night, and the Fox necessarily turns his attention to Field-mice, Rabbits, Ground-squirrels, and insects, such as grasshoppers, crickets, and May beetles, to the great benefit of the farmer. Although it is true that the Fox destroys a considerable number of birds, yet a ruffed grouse has been known to rear its young within 100 feet of a Fox den, and the tracks of the young birds have repeatedly been seen on the fresh earth before the entrance. Among the food brought to the young of this litter and left outside were Rabbits, Mice, and a half-grown Woodchuck, but no birds of any kind."[38]

### Storage Habit

Most animals of the Dog family store up food when they have more than they need. T. W. Proger writes me concerning the Fox (*Vulpes vulpes*) in Wales, that "it usually buries surplus food. These caches it returns to infallibly. I think it probable that the Vixen stores up food as her time draws near, so as to have plenty to eat while she is unable to hunt. I do not think one Fox would touch a cache belonging to another unless hard pressed. They certainly never forget the place, though I do not believe the story that they mark it well by urination.

"A cock pheasant killed by a Fox and cached for a week in cool beech leaves is considered by poachers the finest eating on earth."

Similarly, from all parts of America, we are getting observations on the storage habits of the Fox.

On the fur farm at Dover, Me., the Red-foxes habitually bury food. They watch near the place and are ready to fight any other Fox trying to appropriate the store. If it is interfered with by man, they bury it elsewhere. They return to it as soon as hungry, and if there is more than they need, they re-cache the remainder.

In the den described by G. L. Fordyce was a large separate compartment for stores. In it he found 2 lambs, a ruffed grouse, a Cottontail Rabbit, and a Muskrat, all perfectly fresh, and with the exception of one Lamb, they had not been eaten at all. The Muskrat was not injured in any way by the old Fox, the only marks on the body being where she had crushed its back in killing it. He found this out in removing the skin, which he afterward sold.

[38] Yearbook, 1908, p. 190.

B. R. Ross credits the northern Fox with the highest kind of storage. He says: "When a Fox finds a piece of meat or a fish, he almost invariably hides it, and returns to eat it at some future time. I have remarked this trait even in cubs which I have reared in confinement, and which used, previous to eating, to dig holes in the snow to bury their food, pushing the snow with their noses to cover it. During the commencement of summer he will lay up a store of the eggs of the wild-fowl for his winter consumption. These he deposits in holes dug in the sandbars of the river, or in beds of moss, and at the expiration of several months will, when hard pressed by want, visit his caches. Even when there are several feet of snow, he will readily distinguish the place by scenting his urine, with which a Fox usually sprinkles in a liberal manner all his secret hoards."[39]

This storage habit is asserted also by Thomas Anderson, of Fort Smith. He says that it is well known in that country that the Fox stores eggs for time of famine.

The sprinkling with urine, and incidentally with the musk of the male-womb or protometric gland (see p. 447), is the practice of most, if not all, our *Canidæ*, and is invariable with Wolf, Red-fox, and White Fox.

## Dung and Tracks

Fox-dung is not an attractive study material at first, but after a few weeks' exposure to rain and sun it is dried, bleached, and purified. All fæcal matter is gone, though it retains its shape. Now it is odourless and closely resembles owl pellets.

The undigested remains of Mice, birds, etc., their skulls, feet, hair, and feathers are easily separated and distinguished. A valuable chapter on Fox food can be gathered from such examinations. Those that I have conducted go to prove that, in spite of the facts that the Fox is blacklisted by the Aubudon Society[40] and denounced as a pest by B. H. Warren,[41] there can be no doubt that by far the largest proportion of its food is Mice and, in prairie country, Ground-squirrels; so that, on the whole, I prefer to consider our American Fox a creature beneficial to agriculture.

The tracks of the Fox are known by their size and the straightness of the trail they make. The small pads are characteristic. (The pads of the European Fox are larger.) The claws usually show in the track. (See Plate XCVII.)

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[39] Fur-bearing Animals, Mack. R. Dist., Can. Nat., 1861, p. 17.

[40] The Blacklist, The Conservationist, July, 1919, p. 100.

[41] Enemies of Poultry, 1897, p. 393.

### Sociability

Since the relation of mates, or of the young to the parents, is excluded in discussing sociability, we must consider the Fox but slightly a sociable animal. The only detailed cases I have of Foxes working together refer to two (probably mates) that were combining in a hunt.

The largest number of wild Foxes that I ever heard of assembled was 16. These gathered at the Hotel in the Yellowstone during winter for the sake of the food supplies. Their semi-social manœuvres are thus entertainingly described by L. W. Walker:

"At the back of the Hotel a hill rises, rather abruptly, and at times, when a pan of scraps has been set out where the Foxes can all get at it, I have watched a peculiar manœuvre of theirs. They station themselves at intervals of 30 or 40 feet and seem to act as sentinels. I have seen as many as 10 in a space of 300 feet. When thus placed, one will act as forager and will go cautiously toward the pan. He carefully eyes each window, and listens for the least noise. When the pan is reached and a scrap secured, he bounds away, up the hill, and every Fox is after him; first one having the meat and then another; tumbling over each other until it is all devoured. Then like a body of soldiers they file back to their places and another victim is appointed to do the stealing.

"The Foxes and magpies are much in one another's company; the former walking about the latter, often within a foot of his nose, scolding and waiting for anything that may be left."[42]

### Amusements

This animal is not much given to social amusements, but Norton and Stevens both tell me that on their fur farms in Maine it is a common thing for the Foxes to gather on moonlight nights and chase each other about with most uproarious barking and churring that do not seem to express anything but good-will and hilarity.

Another amusement, not at all sociable but distinctly "sporty," is often noted among the suburban Foxes of Greenwich, Conn. These Foxes have little fear of the Dogs. Indeed, I have oftentimes known some self-reliant old Reynard to go about deliberately teasing the Dogs, apparently as an amusement. The following are illustrative notes from my Journal, written at Greenwich:

April 26, 1921, at night a Fox went squalling for half a mile along the far side of the lake and set all the Dogs a-barking.

[42] Recreation, May, 1897, p. 339.

Oct. 5, 1922, about 4 A.M., a Fox screeched all around the lake on the far side. It set all the Dogs barking and all the roosters crowing. The same thing took place Oct. 3d., and again on April 11th.

A still more amusing case is sent me by B. A. Eastman, the well-known sportsman of Barre, Vt. It is quite in line with some of my own experiences. He writes me, April 3, 1924, as follows:

"The hound was in pursuit and the Fox passed me out of range for a shot, running rapidly. It was in an open pasture where I could keep the Fox in view for some 400 yards. The hound was some distance behind the Fox, and in crossing a highway lost the trail and, while hunting for it, became mute. During the time, I had watched in the direction where the Fox went out of sight, and was surprised to see it coming back running rapidly, stopping and anxiously watching and listening until it again passed me, going out of sight in the direction where the hound was seeking the lost trail. A few minutes later the hound commenced to tongue, having found the lost scent, and the fox returned over the same course running faster than ever.

"At another time it was much the same, except that the Fox did not return over the same course, but came back running to high elevations, and listening, and finally nearly ran over me in its eagerness to find the hound."

My experiences with the Springfield (Ont.) Fox (1888) gave me a large idea of the Fox's sporty mind. Night after night, when I went prowling with my hound, not to hunt but to learn things, one of the Foxes that lived nearby would give the Dog a run. At first it seemed like the ordinary chances of the hunt, but I soon found that the Fox would come to meet us if we were slow or late. Several times I sat down on a log to wait and listen, with the Dog at my feet, when from the near woods sounded the tantalizing "Yap, yap" of the Fox.

Away would go the Dog in full cry, but the weather was hot and the scent poor, and soon the Dog would come back panting to lie at my feet. Within three minutes the Fox would announce his return by his yapping bark, coming nearer and barking more loudly, till the tired Dog was led off on his fool's errand once more.

This game they played several times by daylight, and I had the pleasant experience of seeing how the Dog was fooled when the Fox wanted to get rid of him.

Reynard would lay his trail along a steep sandy cutbank that bordered the river. On dry sand, the scent is at all times poor, and in this case, the

sand fell into his tracks so as apparently to destroy it altogether. At any rate, it was usually here that the Dog lost it.

On one occasion, I was hidden within 15 feet of that old dog-Fox, as he sat on his haunches to watch the Dog vainly looking for the trail on this bank, the Fox grinning to his ears as the Dog went searching about. He not only grinned, but, though quite unwinded, he uttered a loud panting noise that surely was a Fox laugh. In his eagerness to see the result of his trick-trailing, he several times stood up on his hind legs. I never had any question of a Fox's sense of humour after what I saw on those occasions.

All of this took place in June, July, and early August.

### Playfulness of the Fox

Will W. Christman of Delanson, N. Y., after describing the finding of a Fox den in April, adds:

"A few days after this event, my boy and I were witnesses of a most remarkable Fox play. My youngster was starting out to get the cows late one afternoon, when I saw what I thought at first was a shepherd Dog among them, and the Cattle seemed to be taking turns at charging him. They were perhaps 250 or 300 yards away. As I looked, the Dog made an unusually nimble leap to avoid being gored and I grew suspicious. I called the youngster back and told him to go cautiously along the ridge and take a look at them from a rocky ledge where he could see without being seen. In a few minutes he returned excited and out of breath. It was a Fox, as I suspected. I took my gun and we hurried along the ridge to witness the sport, and incidentally to have a little fun ourselves at Reynard's expense. We crept up within 50 or 60 yards of them. The Fox behaved exactly like a strange Dog among the herd. When one of the cows would charge him, he would run a little way and 'side step,' then another would lower her head and take after him. The Fox apparently enjoyed the excitement, but there were 7 cows in the herd and they kept him busy dodging them. His conduct was extremely aggravating. He would sometimes stand till one almost caught him, then he would run and turn and provoke another to the chase. I tried several minutes to get a bead on him, but the cows pressed him close. Finally they separated far enough for me to take aim without endangering my Jerseys. I must have fired too soon, for he turned and gave us what I thought was a very reproachful look before he disappeared in the neighbouring hard-hack."[43]

The old fox-hunter, "Stanstead," writes: "One evening, years ago, driving in the town of Highgate near the Canada line, as I approached a

[43] The Ways of Foxes, Forest & Stream, May 25, 1907, p. 811.

farmhouse, I saw down in the pasture some 300 yards away, a group of Horses standing with their heads together and heels out; and near by was a flock of geese and goslings waddling up toward the house. Very soon the Horses broke ranks and with heads down started along toward the geese; and I then saw that they were following a Fox. The Fox stopped and faced the Horses, which immediately whirled with their heads together with heels out as though to repel the attacks of an enemy. The Fox then trotted along after the geese and the Horses broke ranks again and followed it. I called to the people in the house to come out and get their geese which were then near the road. The Fox heard me and, of course, bolted for the woods."[44]

In J. G. Millais' "Newfoundland" (1907, pp. 302–03) is a similar case of a Fox teasing a bull Caribou.

### Friendliness of the Fox

The British Fox is well known to form occasionally a friendship with the Badger, so that they live together, at least, in the same den. Our American Fox also shows a friendliness of disposition that leads to most incongruous associations.

Charles Sheldon writes that, while Sheep-hunting in the mountains about the divide between Tustamena Lake and the Kenai River, Alaska, Sept. 18, 1912, "we saw what the Colonel said was a most remarkable and unheard-of sight. Three rams were on the side of a hill, walking along in single file, and a Cross Fox was walking with them, he jumping up and biting their faces in play, and they butting him gently along in front. When they lay down, he lay down too, and they were evidently travelling together and the best of friends. We watched them for fully 15 minutes through the glasses at about 300 yards. There was another ridge, some 200 yards farther on, and we crawled along this, but when we reached it the rams had disappeared. We saw the Fox some distance off, but could not find the Sheep again.[45]

A remarkable case of a Fox making friends of a band of Newfoundland Caribou is furnished by Donald R. Dickey.[46] On Nov. 6, 1916, he was watching on the marshes of Sandy River, Newfoundland, for the Caribou migration.

"A moment later," he says, "I was astonished to see a light-coloured Red-fox (*Vulpes deletrix* Bangs) walk out from a point of near-by timber, and zigzag casually through the middle of the band. The Caribou seemed to be on perfectly good terms with the Fox, and all in all, his actions and their

[44] Forest & Stream, Sept. 1, 1906, p. 333.

[45] Journ. Mamm., Nov., 1921, p. 234.

[46] As above, May, 1923, pp. 121–22.

response reminded me exactly of a sheep-dog working through a band of domestic animals. He wandered here and there among them, and finally drew apart and lay down on a little knoll while they fed. I was utterly at a loss to account for his having definitely sought out the band. It is possible that migrating Caribou stir up Meadow-mice in their travels, and that Foxes take advantage of this fact. I had no evidence, however, that this particular Fox was in search of food when he joined the herd. It may well have been nothing more than a coincidence, or an expression of casual curiosity on the part of the Fox, or a mere search for companionship with a non-competitive species. On the other hand, it may be that there is a definite interrelation between the travelling bands of Caribou and the local Foxes. If this is so, he may have trotted out to join the band with some definite and ulterior food-motive in his mind, such as that suggested above.

. . . . . .

"The Caribou paid no attention to the Fox beyond casting a casual glance in his direction when he passed within a few feet of their muzzles, as they fed. It seemed as though he definitely enjoyed their company, but that feeling may well have arisen in my own mind, as I watched him, without proper basis in fact. After half an hour's siesta in the midst of the herd, the Fox jumped down from his knoll and trotted back into the timber from which he had come. As he did so, a few of the hinds gazed after him curiously, but most of the animals did not even raise their heads as he moved among them."[47]

A similar experience is recorded by H. A. P. Smith of Digby, N. S. "Many years ago, and before our Caribou had vanished from Nova Scotia, an Indian companion and myself sat watching a herd of 11 Caribou that were lying in the centre of a large moss bog in the interior of this province. My rifle, a Snider, was good for about 200 yards for anything like a certain kill, and the animals sought were some 400 yards away. Looking them over with a powerful Deer-stalking telescope, I could note their every movement. All were lying down except one. This invariably was the habit of a herd; always one animal stood guard, and we used to call it the 'watchman.' From over a barren hill came a Fox. He stood and looked at the Caribou, then trotted down toward them. The 'watchman' saw him at once and turned slightly facing him; the resting herd all lay still. Right among the Caribou walked the Fox. He went from one to the other, flipping his brush from side to side, and rubbing his flank against their noses. They turned their heads slightly and seemed to enjoy the performance immensely. Perhaps I can better illustrate the instance by likening it to a domestic Cat

[47] Journ. Mamm., May, 1923, p. 122.

PLATE XCIII.—FOX APPROACHING TO ATTACK (A GOAT)
Life study by E. T. Seton, 1880

purring and rubbing against one's leg. That they were the best of friends there was no shadow of doubt.

"For some time the Fox played about among the animals and then, selecting a flat boulder, curled himself up right in the middle of the herd and went to sleep. It was a long way to camp and a storm was threatening, so, taking a chance, I held my snowshoes in front of me and began to crawl toward the game. The 'watchman' stamped his foot, and instantly every animal was upon its feet. The Fox ran in and out among his friends apparently giving the alarm and soon disappeared over the hill. Not so the Caribou; their fatal curiosity, as always, got the better of them. They stood facing me and then began milling about. I was wearing a pair of scarlet lumberman's socks. Turning over on my back in the snow, I kicked my feet in the air, and glancing sideways, I saw the whole 11 trotting toward me. They finally walked up to within 50 yards of my position. Sitting up, I picked out the finest pair of the lot. Nine Caribou raced away with a flurry of snow behind them, disappearing over the hill where their friend Reynard had preceded them."[48]

As illustration of the friendliness of the Fox, George L. Fordyce, of Youngstown, Ohio, sends me the following: "On one occasion when digging for a Red-fox that had been wounded and gone into a den, we dug out a pair of Skunks. Another time, when digging out some young Foxes, we found a Skunk in that den."

A still more surprising illustration is offered by Cram. He says: "To see a Fox get round the farmer's Dogs, in order to make friends with them, is one of the most astonishing revelations of character. Usually the Dogs seem hardly to know at first what to make of his advances, but the Fox is pretty certain to succeed in bringing them to his side in the end, and after that they may be seen playing together day after day.

"If, as I am sometimes tempted to believe, the Fox really works this scheme with the deliberate purpose of making it safer for him to get at the farmer's chickens, he is gifted with a degree of shrewdness beyond anything he has been credited with."[49]

## Enemies

There can be no doubt that in the northern wilderness, Foxes are preyed on by Wolves, Lynxes, and Fishers. In all the prairie sections of America and Canada, the Foxes have decreased with the increase of the Coyotes, which may mean that the longer-legged Coyotes prey on the Foxes, or else

[48] Journ. Mamm., May, 1923, pp. 122–23.

[49] Am. Anim., p. 267.

that changing conditions have set up new problems of life which the Coyote has been better able to solve. The young Foxes are destroyed by every evil beast that can find them, as well as by most of the larger birds of prey.

The killing of a Fox by an eagle was witnessed near Estevan, Sask., and fully described by W. M— in *Forest & Stream*, Feb. 8, 1896, p. 114. The eagle was the aggressor, and the Fox, being on the open prairie, had no chance to seek cover. The Fox was probably of the race *regalis*.

Since the Skunk is a rival for the same foods, it may be considered an enemy of the Fox tribe. But most individual Foxes have learned to let the Skunks alone.

A curious illustration is afforded by L. W. Walker who had charge of the Yellowstone Hotel to which Foxes and Skunks came for food scraps in starvation time—that is, snow time. The Fox in question was named "Nickle." "A few evenings since, 2 Skunks were holding a hot debate over the possession of a piece of meat thrown out for the Fox. The 'Nickle' stood within a few feet of them, watching the quarrel, but recognizing their peculiar strength, was wise enough not to interfere. He waited patiently until they had rolled away from the meat, when, with a spring, he had it and was away."[50]

On Sept. 16, 1901, while camped in Colorado, on the south fork of Williams's River, the boys of my outfit found a sick Fox (*V. f. macrourus*) in a willow thicket. It was very thin and weak, and its hind-legs were paralyzed; it could hardly walk. One of the men killed it with his riding whip and brought it to me for examination. Its mouth was full of Porcupine quills, doubtless its inside was also suffering from the same, but its condition was such that I did not risk an autopsy. Though an adult male, it weighed only 6 pounds 10 ounces.

I have several times seen a Fox mobbed by birds, usually crows, but once by a lot of kill-deers. These noisy plovers seemed to be actuated by fear for their young, recognizing very clearly that the Fox was an enemy, but the crows could not have been inspired by such a thought; in one case, indeed, it was mid-July, but the Fox had already secured a fowl, and the crows were mobbing him because, knowing his dislike of "a scene," they hoped he might abandon his plunder to get rid of them, and so they would profit by his success.

A deeply impressive record of circumstantial evidence is contributed by F. H. Pierce, of South Londonderry, Vt. He says: "I had a strange experience not long ago which may interest some of your readers. In digging out a Fox we had holed, we found, about 20 feet from the entrance to the

[50]Recreation, May, 1897, p. 339.

burrow, a dead Hedgehog, badly mangled. Beyond him lay another in even worse shape than the first. At the end of the hole we found the Fox. He, too, was dead, and his pelt from head to feet was full of quills. He had evidently killed the Hedgehogs, who, perhaps, had tried to take possession of the burrow, and had died from his wounds."[51]

### Fighting the Fleas

Every animal with fur so deep as that of the Fox is more or less plagued with vermin. The Fox pays the price of his fine coat, and it is certain that unless he has some effective way of combating them, the fur-lice would reduce his strength so much as to make him an easy prey to other enemies; that is, there is danger of the species being destroyed by the vermin—a circumstance that I believe has often obtained for others in past ages.

But the Fox is credited with an exceptionally clever device for reducing his flea-pests. I have heard the story in different forms and many times. As samples, on which I do not pronounce judgment, I give the following:

Peter Kachline, of Stockertown, Pa., writes: "While in the woods recently, I came to an old sawmill dam. I heard a rustling in the leaves, and keeping quite still, I saw a Red-fox come up to the water with a piece of pine bark in his mouth. He waded into the water, so I could see only his nose, or the piece of bark, sticking out. He stayed that way for about 5 minutes, then dropped the bark in the water, scampered out and ran back into the woods. I examined the bark and found it covered with fleas."[52]

W. C. Vogt writes: "Some years ago, while fishing in the State of Pennsylvania, a Red-fox came out from the edge of the woods into a cornfield. He put his front feet up on the side of a shock of corn and looked as though he was eating corn, but a little closer watching showed he was pulling out cornsilk from the end of the ears. After he got a mouthful of this cornsilk about the size of a man's fist, he started for the stream and, stepping very carefully to the edge of a nice, placid pool, he started to back into the water with his tail first, going very slowly until only his nose and cornsilk appeared above the surface. He then ducked his head under the water and let the cornsilk float. He came up, swam to the other shore, climbed up on the bank, shook the water off and started off on a fox-trot for parts unknown. In getting the floating cornsilk with a long stick to examine it, I found it full of lice, and could see it was a plain case of the lice keeping just ahead of the water, running up his back, then from his nose into the cornsilk to escape getting wet. A friend and I experimented with some Dogs a few days after.

[51] Recreation, March, 1902, p. 227.

[52] As above, June, 1898, p. 476.

The Dogs had fleas, and we used cotton and tubs of water, and, by dipping the Dogs in very slowly, the fleas would run up their backs and jump into the cotton held at the tip of the Dog's noise. Surely the Fox has intelligence."[53]

Last of the cloud of witnesses, General A. R. Benson of Dover, Del., tells me that about 20 years ago, James Kersey, a hunter that he knows well and considers reliable, saw a Fox in the woods along Jones Creek, Del. It came along a wire fence where Sheep were pastured and gathered a bunch of wool, then backed slowly into the creek till nothing but its nose with the wool was above water. Then it let go the wool and went off. Kersey examined the wool and found it swarming with fleas.

### Diseases

There are several records of rabies among Foxes, but none of other epidemics, so far as I know.

Many reports of mange among Foxes have appeared in various journals, but no definite information is at hand.

### Age

The following affords important light on the age attained by this animal. Christian Sanderson, of Chadd's Ford, Pa., tells me (Oct. 30, 1905) that in March, 1897, an old dog-Fox, locally famous as a runner, was trapped near the Ford. A silver collar with inscription was put on his neck, and he was released on the one hundredth anniversary of Bayard Taylor's fox-hunt in "Kennett." He lived and doubtless was hunted many times until 1905, when, after a good run, he was killed at a point 60 miles due south of Kennett. He was evidently aged when killed. Thus he had run for 8 years after he was fully adult. This agrees with the belief that a Fox is old at 10 years and rarely reaches 15.

### Strange Incidents

Geo. A. M. Williams sends me the following from Newburyport, Mass., Nov. 23, 1910. The gunners killed a Fox that week. "It was a full-grown Fox and around its neck was attached—or rather embedded—a small Dog's collar, the size used in puppyhood. It was necessary to cut it from poor Reynard's neck to get it off."

Several cases of Fox surgery are on record. The following is typical:

"One day in winter when the snow was deep, our farmer found a very young Red-fox in the woods, and brought it home. For many months Redtail lived at the farm, and was the constant playmate and companion of the

[53] Field & Stream, March, 1921, pp. 1004, 1030.

PLATE XCIV.—THE FOX SPRINGING ON THE PINTAILED GROUSE THAT HE LOCATED BY SMELL AS IT SLEPT UNDER THE SNOW

farmer's little daughter. When summer advanced, he was placed in an enclosure in the farmyard, where he had his kennel, although he seemed to much prefer a deep hole he had burrowed in the earth beneath it.

"One morning the farmer discovered that in some way he had broken his forepaw. How, no one could tell, unless he had gotten it tangled up in his chain. Although very tame, he now utterly refused to let any one come near him or attempt to touch the broken paw, and after repeated efforts to catch him and put a bandage or splint on the paw, he was so savage that the farmer was forced to conclude the little creature must be shot. He put off this duty, however, as his little daughter could not bear the thought of losing her playmate.

"The following morning, the farmer carried Redtail's dish of milk out and found him lying in his hole, and to the farmer's surprise, he refused to come out. When the dish of milk was placed where Redtail could reach it without moving, he ate his breakfast with great gusto. Looking closely, the farmer discovered how instinct had taught this little creature to make a 'plaster jacket' for his broken paw. There he lay with the paw carefully buried in the earth, which was firmly packed down, and as long as he did not move the paw, it was safe. For many days he lay there, gladly taking food and water when placed near enough to reach without moving the paw, but refusing to come out of his self-made hospital. Finally, one day, he limped forth and gradually the strength returned to the broken paw, and when I saw him last, he was as lively and playful as ever."[54]

Another interesting case of a Fox cub that knew how to take care of himself is vouched for by Dunham Wheeler, of New York. He had 5 young Foxes in a cage; one of these had the ill-luck to break his hind-leg. The others plagued him so that their captor gave him a little box in which was room only for one. Here he at once ensconced himself, snarling savagely and threatening, with back-turned ears, whenever any of the others approached; and he stayed there until the broken leg healed, when he leaped out as sound as ever.

In *Recreation Magazine* of Feb., 1898, pp. 123–24, is a Fox story that has the merits of strong local colour and intense surprise. It took place in the north country long ago, and is told by Eugene C. Derby. I give it in brief:

An old Fox-hunter was waiting on a stand for a Fox that his hound was driving. The Fox was passing out of range, but came at once to a "Mouse squeak." He approached, hidden by a boulder, but at 12 feet, one eye and one ear and the tip of his nose showed round the cover. The gunner fired. The Fox bounded off about 15 feet, then, on the top of a knoll, turned round

[54] Letter from Mrs. W. E. Bullard, Larchmont, N. Y.

and lay down, with tail lapped carefully around him. The gunner slowly reloaded his "muzzler," the Fox still curled up asleep.

Now the bawling of the approaching hound was heard, the gunner turned his head that way for an instant, and when again he looked for the Fox, he had vanished. The man stepped on the knoll, and had a clear view in all directions for a quarter of a mile. But no Fox appeared.

The hound arrived in full cry, but at the place where the Fox had lain down, ceased baying. There was no cover, no trail, no sign of Fox. A second hunter with a hound came. He also had to give it up. The Fox had vanished like a phantom, leaving neither track, blood, hair, nor scent, and all about was open level ground.

A year later, they wounded a Fox which made for this same place. Under one end of a log was an old Woodchuck hole with thick grass around. The wounded Fox crawled into this. When dug out, they found with him the skeleton of another Fox, undoubtedly the ghost Fox of the year before.

Apparently a shot had hit him in the eye, stunning and blinding him. He lay still on the ridge till roused by the baying of the hound. Then by a convulsive, dying effort, he had tumbled into the Woodchuck hole. The hounds evidently sensed that the Fox was dead, so considered the affair closed at the time.

A melancholy incident which I give for its value as a winner of kindlier consideration is the following from the pen of Andrew Price. of Marlinton, W. Va.

"My sympathies were aroused though at the miserable tale of the trapping of a Fox on the mountain overlooking this village. A Fox had been put in a hole in the rocks and a trap set for him. Fourteen days after, that Fox came out and submitted to his fate. When found, he was nothing but a skeleton and was so weak that he showed no fear of the trapper, who put him out of his misery. A story of such suffering is painful to consider."[55]

### Hybridity

On Jan. 28, 1902, at the Cincinnati Zoo, I was shown a curious creature supposed to be a cross between a Fox and a Dog. The Director said it had been found in the woods near Cincinnati when it was perhaps two months old. It was lying in a hollow stump with two others of the same kind. The boy who found them, carried them home without waiting to see of what sort the parents were. Two died, but this one was successfully reared on a

[55] Forest & Stream, April 1, 1899, p. 244.

bottle. Its appearance suggested Coyote rather than Fox, I thought, but there were no Coyotes within some hundreds of miles. The creature was good-natured and friendly, and had much the appearance of a slim, yellowish Sheep-dog.

A cross between a black-and-tan terrier bitch and a tame dog-Fox was kept for some time by Lord Cranley, in England. It was about halfway between the two species in colour and other external characters, but strange to say, the tail tip was black.

The drawing of it was made by Sir Edwin Landseer and appears as Plate 23 in a collection of animal portraits, published, 1853, London.

### The Carrion-Craze

The habit of rolling in compounds of strong or even disgusting smells is well marked in the Fox, and often used by the trapper. The following was related by L. R. Gridley, of Appleton, Wis. His wife's father, a trapper in Wisconsin, found a certain trap sprung again and again, but nothing in it except long Fox hairs. At length he sat up to watch. At 4 in the morning, the Fox came and rolled over the trap. It sprung at once, but could not grip on his broad body; he ate the bait in comfort and went his way. But the trapper now set one of those abominations called a clawed otter-trap, and next night Reynard was caught by the back.

## Marriage Customs

The Fox is more or less a solitary animal in winter. He may travel about with his mate at times when the snow is on the ground, but he never assembles with others of his kind to form a pack.

The mating instinct is awakened in late February or early March, and then the track in the snow is often doubled. Those who in New England have followed it for miles at this interesting period, tell me that all the chapters of romance are duly recorded in the snow—the pursuit, the coquetting, the conquest, even the fight between rivals, are fully set forth in the tell-tale white.

These fights I have never witnessed among wild free Foxes, but L. W. Walker, living in the Yellowstone Park, writes that there they are of daily occurrence in late winter, and the part played by the tail is quite important. When the rivals approach each other with hostile intent, they stand sideways with the tail raised and pointing forward over the back, ready for use as a parry or as a feint; dashing it in the eyes of his foe, the Fox distracts attention or prevents him seeing for a moment, during which time he tries to gain some advantage.

A vivid picture of Fox courtship is given by the well-known woodsman, Will W. Christman. He was fortunate in seeing the affair, and again fortunate, most of us think, in having failed to add the finish he intended.

"While busy about the farm work," he writes, "I have had memorable glimpses of the Fox. On one occasion two years ago, I was ploughing in a remote field. It was an Indian summer day, late in November. All that morning I had taken a lively interest in the insistent cawing of a flock of crows just over the ridge. I was on the point of making an investigation when the flock moved eastward, following a fence row, and then turned down the hill along the woods to the wild pasture. The cawing continued, and mingled with the raucous cries, I heard the barking of a Fox. This sound, so associated with the darkness and cold of autumn and winter nights, seemed strangely out of place. I left the plough and hurried down the hill to witness the performance.

"The Foxes, for there was a pair of them, were evidently not of one mind, which accounted for the commotion. They were standing two or three rods apart, facing each other. Suddenly one rushed forward, the other meanwhile standing motionless. Then I heard a succession of hoarse

yelps and the advancing one wheeled and retreated to his former position. This performance was repeated several times. I could not be sure which Fox was doing the barking, but thought it was the motionless one. At a distance of 175 yards, they paid no attention to me.

"The opportunity was not to be lost. I ran down to the house and 10 minutes later when I returned with the gun, they were still at their play. Screened by the clumps of witch-hazel and hardhack that dotted the pasture, I approached almost within gunshot unobserved, but the ground, honeycombed by the frost of the previous night, crunched under my feet, and at last betrayed me. I caught a glimpse of the pair as they cleared the wall and a good view as they loped gracefully up the hill. One was large and dark, the other smaller and lighter in colour, male and female undoubtedly.

"Twice before I had heard the Fox bark by day. Both times I was quite sure it was a lonely male advertising his bachelor condition; on this occasion, I imagine it was the female reproving a too ardent admirer."[56]

If this truly was a courtship affair, it was unusually early in date, at least two months ahead of the customary season.

Thomas Anderson, of Fort Smith, Hudson Bay Post, tells me of a curious occurrence that he witnessed at Poplar Lodge River, on the east side of Nipigon Lake, early in March, 1896. As he drove his dog-train around a point, he came on a pair of Foxes *accouplée*. Supposing that he could easily secure both, he set his Dogs after them, but they turned their heads one way and raced off side by side, allowing no stick or sapling to come between them; and thanks partly to a slight crust, they left the Dogs far behind and escaped, without parting company.

*Monogamous.* A vast array of facts gathered among wild Foxes and a similar army of indefeatables from our Fox ranches, have definitely settled this: that the Fox is a strictly monogamous animal.

One of the important things established is that the male Fox takes an active interest in the young, and by retroactive reasoning, he must have but one wife. It is law among mammals that no polygamous or promiscuous male ever concerns himself with the welfare of his offspring. Either he does not known which they are, or they are too numerous for possible attention.

Granting the pairing—and the Fox ranchers have settled that beyond doubt—the next question is whether it is for the season or for life.

There is much evidence of Foxes consorting in pairs *after* the breeding season.

Joseph M. Dohan, the enthusiastic Fox-hunter of Philadelphia, writes me that the Foxes are mostly seen in company during the mating season. He

[56]Forest & Stream, Feb. 4, 1911, p. 177.

has also seen it during the hunting time, and has often known them to change off; that is, one take the other's place in a run before the hounds, whether deliberately planned or not, was uncertain. He adds: "I have frequently, in hunting, seen Foxes working together, and there are many accounts of their doing so for the purpose of relieving each other. The fact may be taken for granted, but whether this is the reason may be doubted, since it imputes a high degree of sagacity which I am not sure the animal possesses."[57]

Another strong bit of evidence, showing that the male takes a friendly interest in the female at the non-pairing season, is given by Millais—an interesting item which, though on the British Fox, helps as collateral evidence.

"When food is abundant," says he, "the Fox will often bury what he kills and return later, sometimes bringing a friend with him to sup."[58] And who is this friend? Almost certainly, his wife.

It is well known that the English Fox will unite with another, probably its mate, to catch a Hare, by the old stratagem of drive and ambush. W. R. Hine reports a similar subtlety on the part of the Fox in Manitoba.

Near Morris, in the autumn of 1885, he saw 2 Foxes working together to stalk some Canada geese that were feeding on the open prairie. One Fox was lying in wait in some slight cover; the other was approaching from the opposite direction, 100 yards away. It crawled as close as possible, then, seeing that the ever-watchful geese were alarmed, it began to roll about on its back in plain view, and tumble over, looking much like a bundle of dry grass that is being blown about by the wind. Each move brought it nearer to the geese, who, knowing it well for an enemy, kept moving away as they grazed, and thus drifted toward the Fox in ambush. Hine was satisfied that the two were working together, but did not see it out. When he had got to within about 50 yards he "collected" the Fox and a goose with "right and left."

L. W. Walker says that in the Yellowstone Park, the Foxes feed during winter time on White-tailed Jackrabbits. He says: "When the snow is deepest, they rely largely on Rabbits and on the carcasses of Elk, Deer, and other winter-killed animals. A Jackrabbit gives a Fox a hard run, and Reynard has learned to hunt in pairs, getting on to the runways, and one taking up the chase when the other becomes weary."[59]

These are samples of the abundant evidence that the Foxes consort in pairs, male and female, *after* the breeding season, during the time when their

[57] Letter, Sept. 22, 1905.

[58] Mamm. Gt. Br. & Ire., I, p. 209. Also See *Zoologist*, 1885, p. 164.

[59] Recreation, May, 1897, p. 339.

union is one of friendship and sympathy only. This points to union for life.

The consensus of opinion among hunters and naturalists, according to Dr. Woods Hutchinson, agrees with this conclusion. [60]

Thus, so far as the evidence goes, the Fox is proven to have attained the highest level of animal marriage. They are strictly monogamous, their union is for life, they are faithful to each other at all times, and as different as possible from Dogs, which, indeed, seem to have been corrupted by their long association with man. These facts I have endeavoured to set forth in my story "The Silver Fox," and in my essay on the "Natural History of the Ten Commandments."

### The Den as a Home

There is no direct, but much inferential evidence that when the young Fox couples go a-honeymooning, it is the female that selects the den site. and probably she that does most of the digging.

She is the one most actively interested; on her is the chief urge of the All-mother, and the den is always more her property than his.

The fact that in a large part of the Fox range the ground is hard frozen when the need for a den presents itself, must raise a difficulty. But it seems likely that the difficulty is met in most cases by enlarging the abandoned hole of some smaller animal, such as a Woodchuck or a Skunk.

Geo. L. Fordyce, of Youngstown, O., sends me an interesting account of a den beginning in a 2,000-acre tract of wild land near his town.

In early March, 1917, there was a heavy snowfall.

"On Wednesday, March 7th, it began to thaw and continued to thaw that night. I decided to go out to the Boardman woods Thursday morning, March 8th, to look for the Foxes, taking my lunch so that I could make a day of it. Leaving my automobile on the main road, I went back about a mile to the woods and soon after going into the woods, crossed a Fox track which I followed up to a place where several trees had been blown down. Here the Fox ran for some distance down one of the trees and jumped far off to one side before going on. This was repeated at the next fallen tree, and finally I got to a place where the trees were massed so that I could not follow the track through. I then circled and found several places where the Fox track came out from the treetops for a short distance, and then went back. I followed each of these tracks in as far as I could, and finally followed one that ended where the Fox was excavating an old Groundhog hole. While there was but little dirt thrown out, I looked on the other side

[60] Animal Marriage, Contemporary Review, Oct., 1904, pp. 485–96.

of a little knoll to see if the hole came out, but it did not. When I was perhaps 10 feet from the hole, a beautiful Red-fox came out and gracefully ran away. Its tail was extremely bushy, looking almost as large as the body of the Fox. It came out so quietly and ran so carefully through the snow that I did not hear a sound, but stood still and watched it for perhaps 400 or 500 yards, until it disappeared. I then went farther on into the woods, and finally found another track, which I followed for perhaps 40 or 50 feet, and found a den with a great amount of fresh dirt excavated, and 3 or 4 entrances or exits open. There is no question in my mind but this will be a permanent den for the Foxes. I then followed a track which left this den, through the woods, and found several places where the Fox had stopped and rolled in the snow. Finally, after following it for considerable distance, I could tell by the tracks and the way the Fox ran that I had 'raised' it. While following it, I discovered one place where it had gone into a hollow log, which would be a possible place for young, according to my boyhood experience." [61]

The den, or "earth," is the nursery of the Fox. Although used chiefly while the cubs are nursing, there are cases to show that some Foxes live at home the whole year round.

It is approached by a burrow of 9 to 12 inches calibre, usually on the sunny side of a hill or bank. Sometimes the Foxes make it themselves; sometimes they adapt one that they find.

A Fox den which I examined on a wooded hill, near Toronto, had 2 or 3 entrances. This was made like the home of a Chipmunk, that is, all the earth was scratched out of one hole, though there were several doorways. Those chiefly in use had no earth-pile about them to make them conspicuous. Indeed, one might have been within 10 feet without suspecting their presence.

I have, however, seen many newly made Fox dens which had no earth-pile whatever, though the tunnel was fully 10 feet deep. Evidently the Fox had disposed of the earth by scattering it.

The nest is made in a dry chamber a dozen or more feet from the door, and is sometimes lined with a little dry grass.

Geo. L. Fordyce writes me that in northern New York State he once found a Fox den in a hollow log, another in the base of a hollow standing tree, and yet another in the ground, apparently dug by the old Fox. This was as here shown (Plate CIII). It consisted of two separate parts, the den and a store-room, with a quantity of food.

"I think," he says, "this was originally a Woodchuck den, which the

[61] Letter, March 9, 1917.

LATE XCV.—THE FIRST WHIFF

PLATE XCVI.—THE LAST GLIMPSE

From paintings of the Manitoba Fox made by E. T. Seton in 1886

old Fox enlarged. I have double-lined the Woodchuck part. Both the store-room and the sleeping room seem to have been made by the Fox."

*Ventilation.* "The air-shaft was one of the Woodchuck entrances. The Foxes had only one, but this was the only Fox house I ever knew that did not have 2 or 3 different doors."

The place around a Fox den is usually littered with bones and feathers of their prey, but they also have an indoor banqueting hall. "During the winter of 1878," says Fordyce, "I had tracked a Fox into this den. In early May it was reported that Foxes were killing lambs in the neighbourhood. I went at once to the place and found about the hole some bones, wool, and feathers, indicating that it was the home of a Fox family. The next morning, 2 other boys went with me to dig them out. We followed the main hole, which went down with a gradual slope for about 3 feet from the surface of the ground. It continued nearly level for about 20 feet, where we found 3 young Foxes grown to about the size of an ordinary House-cat. After getting them into a bag, we went back to a branch from the main hole that we had passed in digging. Following it for about 4 feet, we found an enlarged dugout space which was used as a store-room." (See plan, Plate CIII.)

*Cleanliness.* "There was no bed or lining anywhere, just the clean, sandy clay in which the tunnel was made. I noticed in particular also that there was no excrement or offal of any kind anywhere in the den. In fact, everything was decidedly clean and tidy, though, of course, there was the Fox odour. Some bones, feathers, and one or two lamb's legs were found on the pile of dirt that had been thrown out in making the tunnel. There were, however, but few there, and I am inclined to believe that they were perhaps brought out and left there by the young, and would have soon been carried away by the old Foxes. This is a mere guess on my part, but it is very certain that the leavings at the den did not represent more than 2 or 3 days' meals. The scarcity of garbage about the den and the remarkable neatness of all indoors, make me believe that the old ones habitually carry away the dung and rubbish."

### The Den as a Refuge

The use of the den ends practically when the young are raised and scattered. The occasions when a Fox dens in autumn or winter may be considered exceptional.

Foxes have little use for a den in winter. At one time I thought they kept entirely clear of them while the snow was on the ground, but in following one that had gone off with a trap on his foot, I found that he went into

every den and Badger hole that he came to, apparently in hopes of leaving the hateful trap behind.

W. R. Hine tells me that he also has tracked Foxes into dens when there was snow.

But my observations show that the Fox is amply clad to resist the weather, and finds it much safer in winter time to take his necessary sleep in some open place where he can see or hear the approach of any danger.

An exceptional case was reported to me by Mittigwab, an Indian, on Ottawa River. In late October on Des Moines River, Que., a Fox barked at him and ran into a hole. Four days later he saw the Fox again doing the same thing. He plugged the hole, dug it out, and killed the Fox. It was a prime female, but why in a den at this season?

When hard pressed by the hounds, the Fox considers the den a possible, but dangerous, last resort. Old Foxes can scarcely be made to hole up. Cram says: "Although he knows of 3 or 4 dens within easy reach, it is only when wounded or tired out by a long run in light snow, that an old Fox ever takes to earth, though last season's cubs sometimes become frightened when the hounds get too close, and allow themselves to be driven in."[62]

So also, Joseph M. Dohan, an experienced fox-hunter, writes me: "I could never quite understand why a Fox, even when severely pressed, should continue on his line, when he may take refuge in any of the earths which he may find a mile apart throughout the whole of the hunt district. The only reason I can conceive for his not doing so, is that he is naturally suspicious and will not take refuge in any earth except his own, fearing that snares may have been laid for him. I do not mean to state that the Fox never goes to earth except in his own kennel, but that they seem to have a strong disinclination to do so."[63]

These animals reflect the normal and ancient habit of the Red-fox, but it seems that the steady pressure of that man-made peril—the unrestrained, night-roving hound—is developing a new habit. Like the inexterminable Woodchuck, the Fox of New England is proving the wisdom of flying, when in danger, to the bosom of his Mother Earth. B. A. Eastman, the Vermont foxhunter, writes me, April 3, 1924:

"While hunting in a certain section where a litter of young Foxes were raised, I found it almost impossible to run a Fox over 10 or 15 minutes before it would take to the ground. In fact, I saw them run in Woodchuck holes immediately after being jumped. The hound was not a fast-running Dog, and in other localities the Foxes ran nicely ahead of him. I could not, for

[62] Am. Anim., p. 269.

[63] Letter, Philadelphia, Sept. 22, 1905.

some time, account for this unusual occurrence. I believe I discovered the cause. A farmer who lived near the locality, told me stray hounds ran there all summer, particularly during the night. I argue that they were constantly run during their puppyhood, and, of course, ran in their burrows for safety, it having become a confirmed habit of holing as soon as the hound barked. I often hear houndmen boasting of their fast-running Dogs and how a Fox could stay above the ground ahead of their Dogs for only a short run. This may explain it."

Though ready to abandon a den that is much interfered with, there is much evidence to show that a Fox pair will come back year after year to the same den, if it prove to be a place of pleasant experiences.

### Young

The period of gestation is now known to be 51 days, without more than 12 hours' variation.

When the mother feels her time approaching, she manifests something like hostility toward the he-Fox. She becomes possessed of a repugnance toward him that is seen in many animals at this time. Although they have been living and hunting happily together hitherto, she now warns him to keep away. He, no doubt, helped to dig the den, but now he is plainly told to keep out of it.

However puzzling this capricious attitude in his partner may seem, he generally takes the hint and refrains from entering the den until the embargo is removed. This formality is supposed to be about the time the young ones' eyes are opened, that is, on their ninth day.

The young are born in March or early April, and number from 4 to 9. N. E. Skinner, of Winnipeg, tells me that at Winnipegosis he found a Black Fox that had young so early in the season that the mother's pelt was prime, bringing $75, though the young were big enough to rear by hand.

The cubs are clad in lead-coloured fur and look as much like kittens as Foxes when they come. They are blind till 8 or 9 days old. They do not venture out of doors till they are 3 or 4 weeks old, and the den continues to be their only home for 3 months.

### Home Life

The home life of the Fox is ideal. Few animals come up to the Fox standards of love and devotion where their offspring is concerned.

Although the male is not allowed in the den during the first few days after the birth of the young, he continues on guard in the neighbourhood and brings food to his partner.

PLATE XCVII. FORE AND BACK TRACKS OF FOX, DOG AND HOUSE-CAT, IN FINE DUST
ALL LIFE SIZE
From nature by E. T. S., 1901

The unselfish devotion of the mother Fox is proclaimed by all who have had a chance to observe her at the time. Many touching stories are told in illustration.

Fordyce sends me the following interesting notes on the Fox family that he observed near Auburn, N. Y.: "One morning in the end of March, 1877, a man came to the store in the country village where I lived and said that while coming across the fields of a neighbour, an old Fox had jumped out of a hole in a tree near which he was passing, and run away barking. I overheard what he was saying, and as it was the same wood-lot in which I had found the 2 young Foxes the previous June, I at once thought there might be some cubs in the tree. I started out across the fields and 'back-tracked' the man, there being snow on the ground, until I came to the place where he had stopped.

"The tree was a standing basswood about 4 feet in diameter. The Fox track led from the hole at the base of the tree, but no track came to it. As it had snowed the night before, this indicated that the old one had gone in before the snowstorm and remained there until the man had frightened her away. I reached into the hole and found that the hollow diameter of the tree was about 2 feet. I felt a warm bunch of little creatures, one of which I pulled out, looked at, and, as I had expected, it was a young Fox. I then removed my coat, laid it on the snow beside the tree, to put them on a warm spot, and took out the others, 9 in all. The little creatures did not look unlike new-born kittens, but were about twice as large. Their eyes were not open, and I do not think, from their condition, they were more than one or two days old. I selected one of the lot and took it home to raise, but, having no way to feed it properly, it died within a few days. I then followed the track which the old Fox had made when the man had frightened her away from the tree. She had run directly to a hilltop, nearly a quarter of a mile away, and there stopped to watch him. I followed her track farther and found where she had stopped many other places, and, finally, where she had stood on a high stump and probably watched me while I was at the tree looking at her young. In fact, I believe she had watched me from this stump while I had been following her trail, because her tracks showed that she had run with greater leaps from the stump straight away into the open country.

"The next morning I went to the tree soon after daylight, and the young were gone. There was a maze of tracks coming and going to the tree. I started out to follow them, settling down to one which I followed with considerable difficulty on account of other tracks crossing it, but I finally succeeded in locating the den into which she had carried them. It was an old

burrow in a hillside about a quarter of a mile from the tree. In going back and forth, she had gone over a different route each time, sometimes far out from a direct line on either side, and sometimes far beyond (see Plate CIV). The number of tracks showed that she had carried the young one at a time. For the next 2 or 3 months, I went to the locality of the den frequently, and occasionally, from a distance, would see the young Foxes out playing in the sunlight. When I attempted to steal nearer to them, I would invariably hear the old one give a bark or two from some place on the hill, which was a signal for the cubs to disappear into one of the holes. About July 1, when the young became larger, my desire to take one became irresistible. As the den was in ground that was filled with rocks and roots of trees, digging for them was out of the question, so I decided to set traps in each of the holes.

"The next morning I found one of the traps pulled out of the hole and sprung, likely by the old Fox. I set this trap again, but none of the traps were disturbed thereafter, the Fox family having moved away."

On these occasions Fordyce saw only one Fox about, and assumed it to be the female. His observations, however, were made chiefly while the cubs were small.

A more detailed case is furnished me by the Rev. J. Fraser Cocks, of Manitoba. The following incident took place during his life at Silver Creek, Man. In mid-May, 1894, "about sundown," he says, "I saw on a prairie knoll a mother Fox and 5 young. I came on them suddenly; the old one barked loudly with short sharp yaps. All bolted underground by various holes. One little fellow got into a wrong hole that was either too short or too strange, and at once he peeped out again. I threw a pebble at him. It chanced to hit him between the eyes and stun him. I carried him homeward by the hind legs, but he soon recovered, and though no larger than a half-grown kitten, he bit savagely at my legs.

"I chained him up. He barked and whined every night and all night long. His mother came about, and my partner tried to shoot her by watching, but she was too alert. The little one could eat Gophers but preferred Mice. One day, while my partner was teasing him with a dead Mouse, the little chap sunk his teeth in his tormentor's fingers.

"He was a perfect nuisance barking every night, so after a week we turned him loose. He ran for the woods a quarter of a mile off, and was at once met by the mother and led safely away. She had never ceased watching about, all the week, in hopes he might escape, and now I found she had moved the rest of the family away to a distant and safe burrow. We saw nothing of the father."

### Mother Love

Will W. Christman, of Delanson, N. Y., writes on Fox ways: "Hardly a season passes here without someone locating a den and making captive the whole litter. Two years ago, I accidentally discovered one, and with a neighbour's help, dug them out and made them secure in the corn crib. At times they were as playful as kittens, but they often fought like Dogs over their food. The first morning after their capture, I saw the old Fox nosing around their prison. One of the young died in a day or two, and my boy carried it to the woods. The next afternoon, when he returned from the pasture with the Cows, he informed me that he had found a young Fox dead near the scene of the capture. I thought at first that it might have been one that had died in the nest, and we had overlooked it when we destroyed their roof tree; but after investigating we found it to be the one that had died in captivity, as the one could not be found that my youngster had disposed of. We concluded that the mother had carried it back to the old home, a quarter of a mile or more. How unconquerable this mother love! I must confess that I felt something like remorse at finding such a human trait in my enemy."

One April, he and a trapper friend went to an abandoned farmhouse in their neighbourhood.

"As we entered the door yard," he says, "I found a Muskrat hide, freshly skinned, on the grass, a little farther on, some bunches of Rabbit's fur. 'Have we a Fox den here?' I thought. 'Here are the usual earmarks', but it seemed a most unlikely spot. At the corner of the house we found a hole, probably opened by a Woodchuck, leading directly into the foundation. Scattered about were hen's feathers, and a small Pig had been poked into a crevice in the crumbling foundation. The Pig was one that a neighbour had lost a few days before, and had been consigned to the manure heap. Now it was evidently held in reserve as a choice morsel for some wild gourmand. After a careful examination of the hole and of the cellar—for the doors were unlocked—we plugged the opening with stones, promising the tenants a call later in the day.

"That afternoon I was called away, and my neighbour, after waiting some time for me, started alone for the prize. A large straw-stack stood near the house, sloping gradually down to where the machine had stood in threshing time. As he neared the place, he saw the old Fox on the top of the stack. From this 'coign of vantage' she could overlook the surrounding fields for half a mile. This was undoubtedly her 'crow's nest.' No friend or enemy could approach unseen. She took to her heels as my friend

approached. The cellar had been lathed and plastered, and far down in a remote corner behind the plastering, he found them, 3 lively little fellows, about half as large as a fair-sized Cat, and 2 very small ones dead. Probably some hound had given her chase shortly before their birth. This would account for the mortality among them. (Since then another neighbour informs me that he found 2 of the young dead in a hole.) We kept them in the corn crib as we had kept those of the year before. I think the old Fox came nightly and prowled around the buildings. One of my hens had hidden her nest in some berry bushes between the corn crib and wagon house. One morning I found her limping around the barnyard minus her tail. Every tail feather was pulled out and scattered in a bee line from her nest to the yard. Her eggs were cold, and she seemed to have lost all interest in them. I looked again next day and several of the eggs had disappeared. I took them all away, and at night took a fresh egg, and after putting a little strychnine inside, I placed it in the nest. That too disappeared, but it was several days before I knew that my experiment had been successful. Then my boy found the female Fox dead in the edge of woods, less than 100 yards away."[64]

### *The Spartan Mother*

I had several times been told by hunters of Fox mothers poisoning their captive cubs because they could not free them. I am more sceptical of these accounts now than I was formerly, because the evidence was faulty, not because, as some have illogically asserted, this would postulate a knowledge of the nature of poison and of death on the part of the Fox. It would be just as true to say that a Cougar has a comprehension of locomotor paralysis because it aims to disrupt the spinal cord of its victim.

Without pretending to decide finally whether these were cases of Spartan fortitude, perverted instincts, or merely brutal murder, let me refer to certain other tragic happenings that have taken place under the urge of unusual stimulation, and to certain well-known facts that bear on them. Cattle will often kill one of their own kind that is in dire extremity; a crow in trouble is sometimes destroyed by its friends; a Mouse in a trap is often devoured by its own companions. E. Hofer reports a case in the Yellowstone of a little Bear cub that on the first night of its captivity was killed and eaten by one of its adult wild kinsmen. In menageries, many carnivorous mothers, including Foxes, kill a large proportion of their own young, especially when they learn that man has tampered with them.

[64] Forest & Stream, May 25, 1907, p. 811.

And, finally, Wolves and Foxes have certainly grasped the idea that poison is a thing of danger. These various facts bring us much nearer to acceptance of the hunter's tradition, without, however, being conclusive. They at least remove it from the category of the wildly impossible.

### The Father Fox

But the father is ever ready to play his true part. Many observers, among them W. R. Hine, have found the home in cubbing time, and in each case both parents were about; it seems quite certain that the father takes an active interest in the young and helps to care for them. All of which emphasizes the conclusion already offered—that our Foxes pair.

In Ontario, where I well know the Springfield Fox, I made many observations showing that both parents take active care of the young. In Maine, E. Norton says, the male Fox has as much to do with raising the family as the mother has.

A veteran fox-hunter, J. H. Whitcomb, writes me from Ayer, Mass., on April 3, 1909: "A day or two ago, I saw a Fox den where I think there were young ones, and close by in the sand a Skunk half buried. I suppose it was for madam, to save her from hunting."

In Wales, as T. W. Proger of Cardiff writes me, the male Fox is a faithful partner, bringing food to the female while she is suckling the young, and has a great affection for his offspring, sharing with their mother the labour of feeding and caring for them.

"When the cubs are very young, he will frequently bring food right up to the earth, but as they get older he does not do this, but drops it at a distance from the earth, 100 yards or more. This may be done to teach the cubs to hunt for themselves, for the Rabbit or bird, as the case may be, is often covered lightly with leaves and mould, and it would certainly be very good practice for the youngsters."

A touching case of this paternal devotion was sent me later by this same naturalist:

"Last spring our old keeper destroyed a litter of young cubs, and stopped them into the earth. Four days afterward the old dog-Fox came right up to the earth and began to open it out again, I concluded, to seek his cubs, but he was caught in a trap which the man had set near the blocked-up entrance.

"I think this is very strong proof that the dog-Fox has affection for his young, because he knew very well that the trap was set there on the first night after the deed was done, but his strong desire to find the cubs overcame his habitual caution."

In the New York *Sun* for June 2, 1900, is given an instance in which the father joined with the mother in a hazardous rescue of their young.

"'Some weeks ago a den of Foxes was discovered on the bank of the Miami River near Redbank by 3 boys, John Bain, Lewis Shumate, and a boy named Lloyd. Young Lloyd took 2 of them to his father's place, near Redbank. They were fastened to a kennel with stout cords attached to collars. It is stated that persons in the vicinity frequently heard the old Foxes bark at night, and on Saturday night last Farmer Lloyd, hearing a commotion in the barnyard, went out and saw the parent Foxes scurry away. He then went to the kennel and found that the cords which had confined the young animals had been chewed in twain and the little ones were missing. It is the supposition that the parent animals released their young and carried them away in their mouths, as a Cat does her kittens.' Cincinnati *Enquirer*."

Referring to the second den which he found March 8, 1917, George L. Fordyce writes me that it "was used, and a family of young were reared there. I visited this den several times during that spring and saw evidence of their being there. I did not let any one know of it, as I did not wish to disturb this Fox family or have any one else disturb them. The male Fox remained with this family during the time I was making these visits, as on more than one occasion he would bark near me while I was some distance from their home, and the female would bark, apparently to let him know she was warned."

From many similar accounts which prove that in the Fur Ranches the father should be allowed to continue with the family, I select the following, from the *Black Fox Magazine*, May, 1921, p. 32. In this, the editor sums up the experiences of many fox-farmers.

"We are strongly of the opinion that harmonious pairs should be left with their families, and we would never separate them unless compelled to do so. Here is an experience we lately had. A litter was born about a week ago, but the pups had not been seen. Five days later the caretaker went into the pen at the usual time in the morning to feed, and noticed nothing out of the ordinary, as the male Fox was out and all was quiet. He did, however, notice that a Fox had been burrowing, and he plugged up the hole, stamping the ground down solid. About noon of the same day, in looking toward the pen, the male Fox was seen digging as hard as he could, and the dirt was flying in all directions, and the Fox was panting like a race Horse. The keeper felt that something was wrong, and, calling his assistant, they took shovels, and after digging down where the father Fox was labouring, they found the mother and four pups. After putting them back

PLATE XCVIII—LIFE-STUDY OF THE FOX THAT ATTACKED THE PORCUPINE, COLORADO

PLATE XCIX—IMPRESSIONS OF A FOX'S FEET
FROM LIFE

Secured by Mrs. Grace G. Seton. *rf* = right front; *rh* = right hind; both are life size

in their underground den they seemed none the worse for their outing. Had it not been for the male, the chances are that nothing would have been discovered out of the way until it was too late to save this female and litter."

During June and July, I often visited the Ontario Fox den already referred to, sometimes going at night, and usually taking my hound with me. On each occasion, long before nearing the place, we were met by one of the old Foxes, who would deliberately cross our path or bark at us from a hillside, tempting the Dog away in pursuit. The latter would dash off at full cry, and I could tell by his tonguing that the trail led to a distant part of the country, either along the railway track or down the river, where the Fox easily got rid of him by some trick. One of these tricks I witnessed in daylight. The Fox led the Dog down the river, then, retracing his steps for 40 or 50 yards, he scrambled along a steep bank of sand that edged the stream. The sand apparently carried no scent; the hound could not follow it at all.

I saw the Fox do this several times at the same place. Indeed, he was shot here by one of my friends, in the act of repeating the performance. This turned out to be the male Fox. Evidently he was actively interested in the care of the young.

In view of all this evidence, direct and collateral, we are very safe in believing that the American Fox, like its European cousin, is very nearly ideal in its family relations.

The following from the pen of an old lumberman, whose name is withheld by request, affords not only clinching evidence of the he-Fox's good fatherhood, but also a charming picture of Fox family life at its best.

"I had been out looking over some timber prospects and had sat down near the bank of a creek, alongside of a big rock, to rest awhile. On the opposite side of a stream, not more than 5 rods away, was a high knoll. At the foot of that knoll a tree had been blown down by some old-time high wind, and by the fall the ground for quite a distance about had been loosened, showing a tumbled mass of earth and rocks and tangled roots.

"Between the creek and the fallen tree, the space was carpeted with a velvety stretch of grass. As I sat there gazing listlessly about on the surroundings, I noticed by and by that the soil and the stones at one side of the fallen tree were packed hard and worn smooth, indicating that something was in the habit of going to and fro there, and doubtless had a home beneath the tangle of the roots. I was on the point of getting up, crossing the creek and investigating, when I saw the nose and part of the head of an animal come cautiously out from an opening among the roots, and I sat still.

"It was plain that some animal was making a precautionary inspection of the surroundings. That inspection proving satisfactory, out from the tumbled mass stepped a Fox, boldly and proudly, and at her heels came 3 little Foxes.

"The old Fox, winking in self-contentment, sat down in the sunlight that was streaming in on that spot through the treetops, while 2 of the cubs played pitch and toss with her long bushy tail. A frog which had unwisely ventured from the creek border too near the Fox den, had betrayed its presence to the other cub, and that pudgy little beast at once seized it and began putting it to all sorts of torment.

"I had not long to wait for a new thing on the programme, for out of the bushes at one side of the knoll, another Fox, the other head of the family, came trotting on the scene, carrying a Rabbit in his mouth. Stopping in the midst of the family group, this Fox tossed the Rabbit in the air, caught it again as it came down, and then placed it on the ground before the eager cubs.

"The two old Foxes sat on their haunches and watched with evident satisfaction and approval the cubs, as they rent the Rabbit and devoured it. The meal was soon over, and then the whole family, old and young, capered and frolicked about on the grass carpet in front of their home.

"Suddenly the father of the family stopped his play, and instantly the others became quiet. With ears erect, nose high in the air, brush stretched straight out in line with his back, fore-feet braced well to the front and hind legs ready for a start, the Fox for a few seconds stood motionless. Then he gave a low cry and the 3 cubs tumbled helter skelter into the opening among the roots and disappeared. The cubs safely below, the old Foxes followed them down into the retreat.

"In a little while, the cause of the Fox family's alarm appeared. A chopper, on his way home, came along the creek on that side, passed by the knoll at the very threshold of the Fox den and went his way.

"I waited a long time, then, with no sign of a reappearance of any member of the family, and I was thinking of moving on, when I happened to turn my head and glance up the tree. There another unusual sight was presented. In an open space near the edge of the water on the side of the creek where I was, a ruffed grouse was scratching and pecking in the dirt. So I remained quiet and watched the bird.

"By and by I mechanically turned my head again, and glancing toward the knoll, I saw that my eyes were not the only ones that had discovered the grouse at the edge of the creek. The old dog-Fox across the way, peering out from his retreat among the roots, had seen the bird too. He

had come partially out from the den and was watching the grouse with eager eyes.

"Presently he stole away like a shadow into the bushes at the lower side of the knoll, and disappeared. A little later I saw him come creeping stealthily out, 100 feet down the creek. He stood there motionless a moment and then slipped noiselessly into the water. He swam the creek, gained the shore, scattered the water from his fur by a few vigorous shakes, and went silently out of sight in the bushes.

"I looked up the creek again. The grouse was still scratching and pecking in the open space near the water. That the bird was the object of the Fox's manœuvres, I of course had no doubt, and I kept my eye out for the next development. It was not long in coming. I saw sly Reynard come creeping, shadowlike, out of the bushes into the open in the rear of the unsuspecting bird, and steal step by step upon it.

"That he would have had his teeth in the grouse's neck a moment later is as sure as bird and Fox were there, but I wasn't going to stand for that, and before he could make his fatal spring, I rose quickly to my feet.

"Away whizzed the grouse into the woods. A flash of red fur and the Fox was gone. And although I sat down again and remained there a good half hour, he did not return to his den nor did any of his family show themselves. It was plain that the show was over, and I rose and went home."[65]

### Education of the Cubs

One day (July 15) I saw the mother Fox carrying a live hen from our barnyard (at Springfield-on-the-Credit, Ont.) across the river and up toward the den. I believe she was keeping it alive with intent to let the young ones have the practice of killing it, just as a Cat will bring live game to her kittens.

As soon as the young are large enough to come out of doors, they romp and play about in a delightful fashion, combining the elegant suppleness of the Otter with the frolicsome ways of kittens, but are ever ready to fly home at the slightest alarm. Usually the alarm is given by the ever-watchful parents.

Concerning a cub which he kept captive, Geo. L. Fordyce writes: "One day in June, 1876, my cousin and I chopped 3 young Foxes out of a long hollow log. They were about one third grown and quite savage.

"We each took one to our homes. After keeping mine for several months, until well grown, it was killed by a neighbour, on account of catching chickens. It seems to me this Fox did some 'thinking' in its

[65] The Idaho Leader, Gooding, Ida., Jan. 12, 1911.

method of taking the chickens. I had dug a trench in the ground, gradually sloping it down until about 2 feet deep and 6 feet long. At the bottom of the trench I placed a wooden box with a wooden arch leading down to it. When the dirt was filled in, this made rather a good den underground. The Fox was fastened with a chain attached to an overhanging pole, which gave it free access in and out of this den with a radius of perhaps 20 feet on the outside. Our neighbour's chickens were running about the yard more or less, and the Fox began catching them. I watched to see how it was done, and found that when food was given the Fox, it would, instead of eating it, place it almost as far away from the opening of the den as its chain could reach. The Fox would then back down into the hole and wait until the chickens came for the food, and when one got inside the radius of the chain, the Fox would have chicken for dinner instead of the food I had given it. One thing I noticed in particular was that it seldom missed getting a chicken when it jumped for one; in fact, it never made a jump except the chicken was inside the chain limit."

There is, of course, only one brood to the season. The young are nearly full grown by the end of August, but are still in the old home with the parents. Such quantities of game, dead and alive, have been brought to them during the summer that their front door is now dangerously marked with the bones and feathers of the victims.

A curious characteristic of young Foxes is recorded in the following by W. W. Titus. It is paralleled in several other animals, notably young Deer and young grouse: "Major Val Young and Capt. Billy Young had a Fox chase last week. They experienced no difficulty running the grown Foxes, one giving them a race of 8 hours. All the others started went to earth after a short race.

"They found, however, that their Dogs could not trail with any satisfaction the young Foxes, probably one-third grown. The Dogs would strike their trail and go tearing off in full cry, run over it and circle for a mile, come back to where they lost it and hit it again, and dash off to make a complete loss. They decided the scent was very light, and that the young Fox dodged worse than a Rabbit."[66]

J. G. Millais gives a note on the habit of the she-Fox in England. I believe the same remarks apply to our American Fox.

"Vixens, too, often move their cubs when they are half grown, and take them to a considerable distance, hiding them temporarily in piles of faggots or holes in trees so as to be near their regular hunting grounds.

[66] Forest & Stream, June 1, 1895, p. 444.

This is evidently labour-saving, for then the mother has not to carry large supplies of food to her family from great distances. An instance of this occurred this spring (1904) within a few hundred yards of my house. At the beginning of May a Vixen brought her cubs from some other part of St. Leonard's Forest and took up her abode in a large pile of faggots. She remained here for a fortnight, capturing a large number of Rats and a few Rabbits, which were littered about in all directions near the retreat. By the end of May, the same Vixen had removed her family to a bank half a mile to the east, where she stayed with them for another fortnight. She has now left this part of the forest, and is doubtless working another "beat."[67]

The young probably scatter voluntarily before winter, but it is interesting to remember that in England a systematic effort, called cub-hunting, is found necessary each year, in October, to disperse the families and improve the hunting by equalizing the distribution of Foxes.

I have never seen the young accompanying their mother; indeed, 2 Foxes are the most I have known together.

[67] Mamm. Gt. Br. & Ire., I, p. 206.

## His Winter Way of Life

In the early part of the winter the Fox hunts chiefly at dusk, but the growing scarcity of food increases the need for diligence, and in February and March it may be seen abroad at all hours.

I have often followed a Fox track for miles to learn this hunter's methods. He goes facing the breeze, but turns aside to examine every promising thicket and sedgy hollow. He goes to all the places where he remembers having had good luck on previous hunts; he calls and sniffs at all the signal posts as described in the Wolf account, though to a less degree. He adds his own record to those already inscribed. He trots along ridge after ridge, he seeks out a bare knoll on which he has voided dung before now, and, finding the spot, endeavours to repeat the act. He stops at the slightest click of leaf or twig, freezes to a statue in an instant, holding one foot up in a pose of wonderful grace. Sometimes he stands on hind legs to overlook the grass, or bounds aloft for an observation hop, after the manner of a Jackrabbit. He searches the wind with his nose, he trots on by the hour, missing nothing, and passing from cover to cover, in a somewhat zigzag line, but with a general up-wind course. He sneaks by settlers' homes, looking for luck, and is not above feasting on offal. He looks out sharply for the Dog, and, if pursued, easily leaves his foe behind in a few hundred yards, then sometimes turns and barks in defiance, tempting the Dog to further pursuit. He runs across the fresh track of a Rabbit, follows this for a time, and may even succeed in springing on the crouching Bunny; but the latter is as alert as the Fox, and has the advantage of awaiting approach. Usually it gets into the brush, where the hunter must give up the hunt.

In following the trail of a prowling Fox once, I saw where he had dug out a torpid garter-snake, bitten it nearly in two, and left it lying on the snow, intending, it seemed, to come back for it if he found nothing better.

But, farther on, the track recorded how the prowler had scented two prairie-chickens asleep in a drift of soft snow, had stalked them with nose worthy of a pointer and step worthy of a Cat, had come just above them before they awoke to their danger, and when they burst out of the drift, he had sprung and secured the nearer. Having now abundance of this finest food, he was not compelled to go back for the cold snake, which is never good eating, and on a cold day, would have been a very cold lunch indeed (see Plate C).

PLATE C—FOX TRACKS IN SNOW

*A*, showing where the Fox, entering at top, came down and unearthed a snake, which he killed. *B*, the second part, showing where the Fox stalked two Grouse hidden in the snow and secured one. The various pauses as well as the touches of the tail are clearly shown.

When satisfied or tired, he lies down for a nap, not usually in a hollow, but on some exposed place—the top of a bank, a boulder, a log, or a stump. Here he curls up in a ball, his blanket is on his back, and his travelling rug is his tail, his big black ears, sticking a little above his tail, are the only things that break the rounded yellow of the ball.

He looks like a yellow stone, and seems to know it. Once while travelling on the Souris in 1882, my brother and myself noticed a yellow boulder, among others, on a ridge. He said: "Look at that; doesn't it look like a Fox?" I said: "No, I see nothing but a yellow boulder." We marched within 30 paces, ourselves, our wagon, and oxen. When 20 yards past, a puff of wind seemed to cause a crack in the boulder. My brother stopped and said: "I'm sure that's no boulder; it looks to me like a Fox." He turned aside, took one step toward it, and at once the "boulder" sprang up and ran for dear life. A Fox indeed—he scurried across a stretch of burnt black prairie, then, reaching a bit of unburnt yellow grass 300 yards away, crouched down in this and watched us again, not, I suspect, because he knew the grass to be a good match with his own colour, but simply because it was cover.

I do not think he was asleep when we passed him, because we had a heavy wagon and the oxen were driven with the usual noise. I believe he was watching over or through his tail, and would have lain still, trusting to escape notice, had not my brother alarmed him by leaving the trail and stepping toward him.

The Fox does not have its regular hours of sleeping any more than of eating, except that it prefers to sleep in sunlight, but its sleep may be broken into a dozen naps, for it curls up when it feels tired and has satisfied its hunger.

Many other scribbling hunters have learned and used to advantage the snow record as a means of knowing the life of a Fox, and even getting his pelt. The following on "Trailing Foxes" was written by J. T. M., and appeared in *Recreation* for Sept., 1897, p. 214:

"Our way of killing Foxes is to track them in the snow and to shoot them while they are lying down or, as is more often the case, on the run.

. . . . . .

"'Here is a good track, Tom; and here is another, both going the same way,' said Billy. Noting one track was large and the other small, we concluded we were after a male and a female and would find them together.

"Following the tracks a short distance, they showed that the Foxes had been looking for a place to sleep. Now we moved forward cautiously, watching to the right and left more than to the front; knowing a Fox always doubles on his track before lying down.

"The tracks approached a deep gully, thickly grown up with trees and brush; a likely place for a Fox, on a cold windy day. Having the wind in our favour, we walked to the edge and looked in. Yes, there they were: two round, red balls, just behind an old worm fence. . . .

"All the way the Fox had been hunting. Here and there, as we tramped along, we read the signs of tragedy. The trail followed a creek for 100 yards, where the bank hung over; a favourite roosting place for small birds. Several long leaps, a spot in the snow thickly padded with tracks, a few feathers, and the tale is told. The tracks crossed a meadow. Here two long leaps to the right, a hole in the snow, a dead Mouse. I wondered by what one of the five senses the Fox located that Mouse. Farther along he caught a Rabbit, after a straight run of 100 yards. After eating half, and burying the rest in the snow, he started off toward an old slashing. We congratulated ourselves, for the chase would soon be over; but the woods were hardly entered when, 200 yards ahead, we saw him sneaking away. The wind was against us. A Fox places great reliance on his nose.

"After him again, for we know he will not go far without lying down. Presently we see him, or think so, 200 yards away, lying by a tree. Billy stays here while I make a detour, getting the wind in my favour, and trying to get close enough for a shot. Imagine my feelings, after 15 minutes of crawling and creeping, to find the supposed Fox only a bunch of leaves.

"Motioning to Billy, we moved on again. Now we find where the Fox left the woods and started across the fields. Ten minutes more and we see him lying under a thorn-apple bush."

A more recent but highly successful hunter in the snow is W. Dustin White, whose article "Snow Tracking the Red-fox" is crammed with good natural history and original observations. It appeared in *Field & Stream*, April, 1917, pp. 476–7, and contains the following helpful paragraphs:

"If I were planning a camping and fox-hunting trip, I should choose a region of abandoned farmland, bordering on the big woods. . . .

"While any winter day, except when the snow is crusted, is suitable for snow-trailing the Fox, the ideal conditions are about 6 inches of snow—a part of which should have fallen during the evening previous. About this depth is required to deaden your footfalls, and more makes rather hard walking. Foxes lay rather low during a storm; consequently if it snowed a greater part of the night, there will be a scarcity of trails in the morning. If the snow be slightly damp, it not only more effectually deadens the sound of your footsteps but also retains more clearly the impression left by the animal's foot.

PLATE CI.—FOXES FIGHTING

Drawn from the description by L. W. Walker, who witnessed the scene many times in Yellowstone Park
The use of the tail as a foil was continually remarked

"As we venture out in search of the first trail, we soon become alive to the fact that we are viewing the face of Nature in a charming mood. Her complexion is of the most pure white, with an occasional rosy blush where the sunlight glistens. The roadside walls are half buried with the soft blanket, the fences draped with the glistening robe and the trees decorated with white festoons. But as we pass the first farmhouse, we notice a straight, precise trail that leads out from behind the henhouse, where Reynard had sniffed longingly of the warm smell of poultry. As we follow the trail, one of the first things that impress us is that the Fox is a thorough-going sort of fellow. Away out across the fields leads the trail, showing that Reynard had poked an inquisitive nose into every nook that promised a morsel of food—here he dug a Fieldmouse from a tussock of grass, there an old dry bone lay by the pasture wall, while ever so many Woodchuck holes were investigated. Down in the edge of the woods he stalked a grouse—stealthily working near in a crouching position, but his spring was a trifle too short or too late, for no blood nor feathers mar the snow. Farther down, where the ground is swampy, his trail runs into a maze of Rabbit tracks, but, by a piece of good fortune, we discover where he had succeeded in catching one of the Bunnies and made a good meal, after which his trail led straight away—a fact which we note with satisfaction.

"Now the hunting trail of the Red-fox may be long and crooked, but once he finds a good meal and puts it where it may do the most good, he soon looks for a comfortable place to curl up and take a much-needed snooze. And, sure enough, as we work along up on the sunny hillside, we notice that he has been investigating such places as sheltered spots at the foot of low evergreens, or the soft centres of rotting stumps.

"Now the real hunt begins. While we may have been travelling quietly, our caution must now be doubled, and we should also take note of the wind and be careful that it does not blow from behind us. Somewhere ahead are as keen a set of eyes, ears, and nose as ever sifts the sights, sounds, and smells of our Northern hillsides, and if we are to work in past such wary sentinels, we must be cautious indeed.

"So we work along, not directly on the trail but always near it, and ever with an eye out for a patch of red fur at the base of some spruce. But no such luck for ours. Instead we come upon a small round hole thawed down through the snow to the leaves and a track over the hill in long jumps.

"Well, what's to do now? Nothing at present! Sit down and keep perfectly still for a little while. There is a bare possibility that the Fox may sneak back to see for sure what it was that started him, and you should be ready to take a crack at him if he should. After a little while

you might light your pipe, if you smoke one, or eat your lunch, but under no considerations should you attempt to follow that trail for at least an hour. If a Fox be jumped this way early in the day he will, nine times out of ten, if allowed to take his time, curl up for another nap. If jumped late in the afternoon, they will usually keep afoot the rest of the day. In such case we must use our knowledge of the country in planning to follow farther.

"But we have now given our Fox time to forget his scare, so we will take up the trail again. Our first surprise as we follow over the knoll is the comparatively short distance that he ran. In just a little way we notice that he has slowed down to a trot, then the trail shows where he has jumped upon a stump to watch the back trail. Then out across the pasture he trots, through a hollow and up on a knoll. Here he stood for some time, his own body concealed behind a bush, and, as we look back from this point, we can plainly see our own trail where it came down the other knoll. So we see the advantage of not hurrying a Fox that has been started, and it is with relief that we notice that he left this post evidently satisfied that he was not followed. Sure enough, in a short time he was seeking another bed."

### The Wisdom of Wagush

In all ages of record, the Fox has been held as the standard of cunning, the clever beast that, without great strength or unusual weapons, could yet hold his own against the mighty and the well-armoured, the well-armed.

So deeply has this cunning been implanted and grown as a racial character that it has become instinctive, congenital in the young.

From birth they have a deep-laid fear of every strange or peculiar object, and they early acquire a horror of anything that bears the taint of man. They learn much from their parents, no doubt, but a mere baby Fox, brought up from blind, woolly cubhood, man-handled and bottle-fed, begins at an early age to show his ancestry. One of my own childhood animal memories is of seeing a little woolly Fox cub chained in Fee's Mill, Lindsay, Ontario. I was not yet 6, but I was old enough to delight in the tricks and cunning of the little imp.

Their mode of life is, moreover, a constant sharpener of their wits. The quickness with which they learn to distinguish and distrust the latest devices of the trappers is wonderful evidence of their cunning, perhaps also of their power to communicate certain ideas.

Our American Fox must be very close kin of the European, and a recent arrival, too. For in spite of the fact that he has not had 2,000 years of man-directed hostility to overcome as the price of continued life, he has

yet risen to the hardest condition we have imposed on him, has learned our tricks and our follies, and has so far solved the problems we have thrust on him that he increases and prospers, instead of retreats and dies, as agricultural activities necessarily possess the newer lands.

His sagacity, his race cunning, are shown in four ways: first, in eluding his natural enemies, such as Wolves, Coyotes, Wild-cats, and eagles; second, in capturing his prey under new and difficult circumstances; third, in eluding traps, trappers, and poison; and fourth, in eluding hunters with guns and Dogs.

Against eagles, of course, the Fox's simplest protection is brushwood. In the small timber, the Fox is safe, and very rarely indeed is an old Fox seen exposed on the bare open ground remote from the woods. As a matter of fact, the cubs sleeping or playing in the sun near the home den are as a rule all that the eagles can get. If the cubs were left alone, the eagles would likely get them all, but the ever-watchful mother Fox is to be reckoned with. Very very rarely is an old Fox taken by an eagle. One of these cases is related by W. M—— in *Forest & Stream*, Feb. 9, 1896, p. 114.

Wolves and Coyotes are dangerous only in winter when there is deep, soft snow. The shorter legs of the Fox then put him at a hopeless disadvantage, and once he is started at such times, the Fox's fate is sealed.

A friend of mine at Qu'Appelle, Sask., was witness once of such a Fox chase in the snow. Two Coyotes had got on the trail of the unfortunate Fox, and, realizing their advantage, had followed hard. They must have floundered several miles when my friend saw the red-haired one plunging desperately ahead, with the Coyotes evidently on the point of seizing the victim. The Fox doubled and plunged, then, sighting my friend in the cabin door, took the only chance left. He made for the man, and cowered gasping and trembling at his feet, while the two Coyotes hung back in fear, then fled away, leaving the Fox, the wise old Fox, the winner—saved, for what man at such a time would harm a fugitive who confided to him his life?

Wild-cats are said to kill Fox cubs occasionally, but it must be of rare occurrence, for the Cat is afraid of the old Fox, and the young are never left alone till swift enough to elude any Wild-cat.

The Fox has risen wonderfully to the possibilities of barb-wire fence and chicken wire as means of baffling enemies and securing a meal. One often hears of Foxes "leaping over a 7-foot chicken fence." They do not leap over it—they climb up it like Cats. At this they become very expert and if need be can climb a 20-foot wire fence, as can be seen and proven on any Fox ranch.

Many hunters and farmers in England have told me that a Fox never kills near home. It has no wish for trouble with the neighbours. The barnyard next its den is perfectly safe so far as this pair is concerned.

There is a quaint story of a Fox catching prey in a new way that was imposed by entirely new conditions. I have heard of it from several, but cannot guarantee its truth. The story appeared in the Omaha *World-Herald*, and was reproduced in the New York *Evening Sun*, Dec. 21, 1899.

"A gentleman whose word cannot be doubted and who is not easily deceived, tells the following:

"Very early one morning he saw a Fox eyeing most wistfully a number of wild ducks feeding in the rushy end of a highland lake. After a while, the Fox, going to windward of the ducks, put afloat in the lake several bunches of dead rushes or grass, which floated down among the ducks without causing the least alarm.

"After watching the effect of his preliminary fleet for a short time, the Fox, taking a good-sized mouthful of grass in his jaws, launched himself into the water as quietly as possible, having nothing but the tips of his ears and nose above water.

"In this way he drifted down among the ducks and caught a fine mallard."

The trapper and poison are among the new enemies. These as problems the Fox has slowly solved so that they no longer threaten his race with extinction. As an illustration, though in this case the man triumphed, I give the following experience, related by J. A. Newton in *Recreation* (Oct., 1902, pp. 271–2). He was trapping Foxes and working with the old plan of a baited chaff bed. But one locally famous old Fox robbed the bed night after night, by the well-known Fox trick of nosing out the traps and turning them over, so that they were sprung and made harmless.

"I was at length compelled," says Newton, "to seek advice from Daddy Jenks. 'I know a trick fer sech old chaps as that,' he said; 'I'll go with you and see about it.' After setting the trap so it would spring rather hard, he placed it carefully in its bed, but bottom side up. I marvelled greatly at this procedure, but the old man did not explain it. The following morning we were both anxious to know the result, and, to my surprise, found we had caught the wise old Fox. He had turned the trap over as usual, which brought it right side up, but as nothing came in contact with the pan it remained unsprung. No doubt, thinking danger had been removed, as on previous occasions, the Fox had met his fate while recklessly treading around in devouring the bait. I never saw a more crestfallen animal; he cowered as

we came up, looking as if he wished the earth might open and swallow him." I wish I could add that the victor let the captive go.

When caught by the foot, a Fox will struggle violently, twisting and tearing the foot, sometimes till it is torn off. Some trappers say it will amputate the leg if need be. I have never seen this, but I have known the Fox to bite off the imprisoned toes *below* the trap. This, whether design or accident, is the best thing it can do, as it can then jerk free with the least possible loss and pain.

Raymond S. Spears, veteran sportsman and a pioneer among men who have opened the outdoor world to others, relates an experience of Hy Burke, the Adirondack trapper, in a wit-match with a Fox that he tried to poison.

"Someone," says Hy, "had put out a lot of 'pills' along the old road leading to Black Creek reservoir. A 'pill' is a cube of lard an inch long on a side, hollowed out and filled with crystal strychnine. Driving along the old road, the poisoner had thrown chunks of meat—Porcupines, cow heads, hog lights, whatnot—and on top of the meat in the snow were tossed two or three of the deadly pills. Lured by the meat, the Foxes came to feast, and in coming they showed their far-famed caution. We saw where one had dug down in the snow till he came to a pill, and then left the bait. In another place the Fox had dug down to the meat and gnawed it. Where his track led along the sleigh ruts they showed plainly, and Burke exclaimed:

"'That feller's got a pill. See how he spreads his toes!'

"Nearly 200 yards down the road we found where the Fox had pawed away some loose snow and carefully deposited a pill in the track.

"'Now look at that!' Burke exclaimed. 'That Fox carried that pill till he'd thawed it up in his mouth, and could taste the hand that made it. Then he put it down where Jerry would find it! I bet Jerry don't get that Fox! Not unless it eats a poisoned Fox carcass!'

"Burke said that Foxes would not take bait thrown out by a man on snowshoes for a long time after it was put out."[68]

Fourth—to escape hunters and hounds. When first a Fox, especially a young one, realizes that the hounds are after him, he sets off at full speed, never doubting that his wonderful legs can put him beyond reach of any creature that can run. But he soon realizes that the hounds can run as fast as he, and his only chance for safety is in throwing them off the tell-tale scent. Thousands of stories have been told to show how he does this. Let us illustrate with one or two that are offered by reliable witnesses.

Bachman says: "We once knew a Red-fox that had been chased fre-

[68]Forest & Stream, April 6, 1907, p. 529.

quently, and always escaped at the same spot, by the hounds losing the track: the secret was at last found out, and proved to be a trick somewhat similar to the stratagem of the Gray-fox related in our first volume, p. 171; the Red-fox always took the same course, and being ahead of the Dogs so far that they could not see him, leaped from a fallen log on to a very sloping tree, which he ascended until concealed by the branches, and as soon as the Dogs passed he ran down, and leaping on to his old track, ran back in his former path. So dexterously was this 'tour' performed that he was not suspected by the hunters, who once or twice actually whipped their Dogs off the trail, thinking they were only following the 'back track.'"[69]

To this, W. E. Cram adds: "From time to time, he will go back in his own footsteps for a distance, and then leap away to one side and go off in a new direction. Again he runs along the top of a rail fence or stone wall, or over the wet stones of a shallow brook."[70]

The following clever trick was related to me by Geo. A. M. Williams, of Newburyport, Mass., Jan. 1, 1901:

"A farmer was doing some fall ploughing in the field, and on looking behind him, saw a Fox following him up the furrow. His Dog saw him at the same instant and put old Longtail over the hill, where he escaped. The next furrow covered up Mr. Fox's track, and in a very short time after, the hounds came along, until they struck the ploughed land, when they were lost for keeps. If Mr. Fox knew that his trail would be covered by the next trip of the plough, he was a wise one. I think that he did. We run them so much here that they are as keen as briers."

Another device related to me by an old fox-hunter is well known as the "change-off." In this case, the hunted and hard-pressed Fox darted into a long hollow log where lay another Fox who ran out of the other end, carried on the chase, and, being fresh, was able easily to beat the hounds at their own game.

On another occasion, this man saw the Fox run into a herd of Cattle. When the hounds came bawling along, it so excited the Cattle that they attacked the pack and drove them back in such ignominious defeat that the Fox made good his escape.

W. E. Cram, of Hampton Falls, N. H., has usually something of value to contribute when a Northern animal is under consideration. Discussing the craft of the Fox, he says:

"One of his favourite tricks is to cross over deep water on thin ice just strong enough to bear him, knowing that in all probability the hounds

[69] Q. N. A., II, p. 268.

[70] Am. Anim., p. 269.

will break through and perhaps be swept under the ice if the current is strong enough; more than one valuable Dog has been drowned in this manner, but I have never known a Fox to miscalculate the strength of the ice and break through himself. If the stream is not wholly frozen over, he runs along at the very edge of the deep water, where the ice is thin and treacherous, until he comes to a place where he can jump across to the thin ice that reaches out from the opposite bank.

"Then away he goes across the meadows, headed for some sheltered nook he knows of, where he may curl up in the sun on the warm pine needles and sleep until the noisy hounds, footsore, and apparently all but exhausted, come panting up to awake him. When the snow is very light and dry, and just deep enough to make it harder for the Fox than for the hounds, he has a much worse time of it; but it much oftener happens that while the hounds plunge in up to their breasts at every step, he skips off over the white surface without breaking through."[71]

There is a device that I have several times known the Ontario Fox to resort to when pressed by the hounds; that is, run along the railway ahead of a train and cross a high trestle bridge. On one occasion, I knew of a hound being thrown by the locomotive from the trestle into the river below, minus his tail, but otherwise unhurt. I was told, however, that all were not so fortunate, as some hounds had been killed at the same place in a similar way.

*Forest & Stream* of Feb. 5, 1898 (p. 113), quotes the *Springfield Republican* for the following incident in "A Massachusetts Fox Trick." "Being pushed pretty hard by the Dogs, the Fox—for he was an old chap and a cunning one—coming to the railroad again, took to the rail to bother the Dogs, and kept that course for more than a half mile without leaving a track in the snow, as far as we could discover. On the iron rail, you know, the Fox leaves but little scent, especially after a train has passed over it. That is when you heard the Dogs. They were just figuring out where the Fox left the rail. The Dogs found it themselves at last without being caught up by a train, as the old Fox no doubt wished, and as we were afraid."

The editor of the *Westerly Sun* writes under date of June 15, 1903: "Two hounds owned by Sylvanus Peck, of Rehoboth, were killed recently by an electric car, on the Providence and Taunton street railway, while they were in chase of a Fox. The Fox ran suddenly from the fields across the track near, and the Dogs, hot in pursuit, ran in front of the car too quickly to prevent the accident."

[71] Am. Anim., p. 269.

These New England Foxes are among the wisest of their kind. Another case is reported from Taunton, Mass., by "Fox Hunter." "A recent report that a Fox in Canaan, Conn., leads the pursuing Dogs to their death by running upon the railroad tracks until a train comes along, when he crosses the rails in front of the locomotive, finds its parallel in the fact that a number of Dogs in this vicinity have been maimed or killed by the same procedure; in fact, I had a young Dog some time ago that was run down in the same way while following a Rabbit. My Dog had his legs broken and had to be killed in consequence."[72]

It is very hard to say how much was intentional on the part of the Fox. The fox-hunters who know the animal say *it was intentional throughout.* Some maintain that it was entirely accidental. It certainly was not necessary for the Fox to know anything about train times, as he could *hear* the train coming miles away. The track is a notoriously bad place for scent to lie, the trestle was a place of difficult footing, like a sloping tree, which often furnishes refuge, or the steep sand bank already noted, where I several times saw the Fox baffle the hounds. He might run to the train, just as I have known a Deer or a Hare run to a wagon or sleigh when flying for its life, preferring the unknown terror to the certain death. Add to this the element of luck when first the Fox made the attempt; success that time would lead him to try again.

## Courage

Nearly every writer that ever treated the Fox has lauded his cunning, his fox-craft, and has done it in a superior sort of way, as though, after all, it was low cunning, not the wisdom of a "noble brute." Not one of them in formal treatment has emphasized the high qualities of the Fox, his dignified and gentle fatherhood, his unflinching front when faced with a cruel death, his heroic courage. I rejoice then in this set occasion on which I can tell of it, confirmed by my witnesses.

W. E. Cram says: "I have more than once seen a Fox turn and drive the hounds back when they got too close."[73] Think of it! A 10-pound Fox, all alone, attacked by two or more 75-pound hounds that have the backing of men with guns. Think of it, and get new light on the character of the "shifty" Fox!

That nerve and self-possession are among the gifts of the European Fox is shown by the following from Brehm's "Life of Animals." "Once a Fox, which was being hunted by hounds, and had twice heard the shot

[72] Forest & Stream, Dec. 31, 1910, p. 1058.

[73] Am. Anim., p. 269.

PLATE CII.—A WINTER MEETING OF FOXES, APPARENTLY THEIR ONLY SOCIAL GATHERING

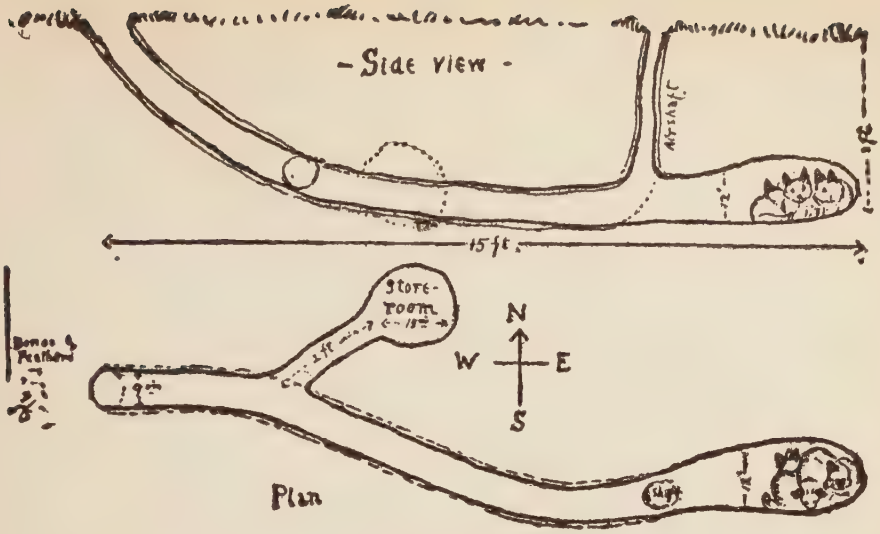


PLATE CIII

Side view or elevation, and plan of the fox-den opened by Geo. L. Fordyce

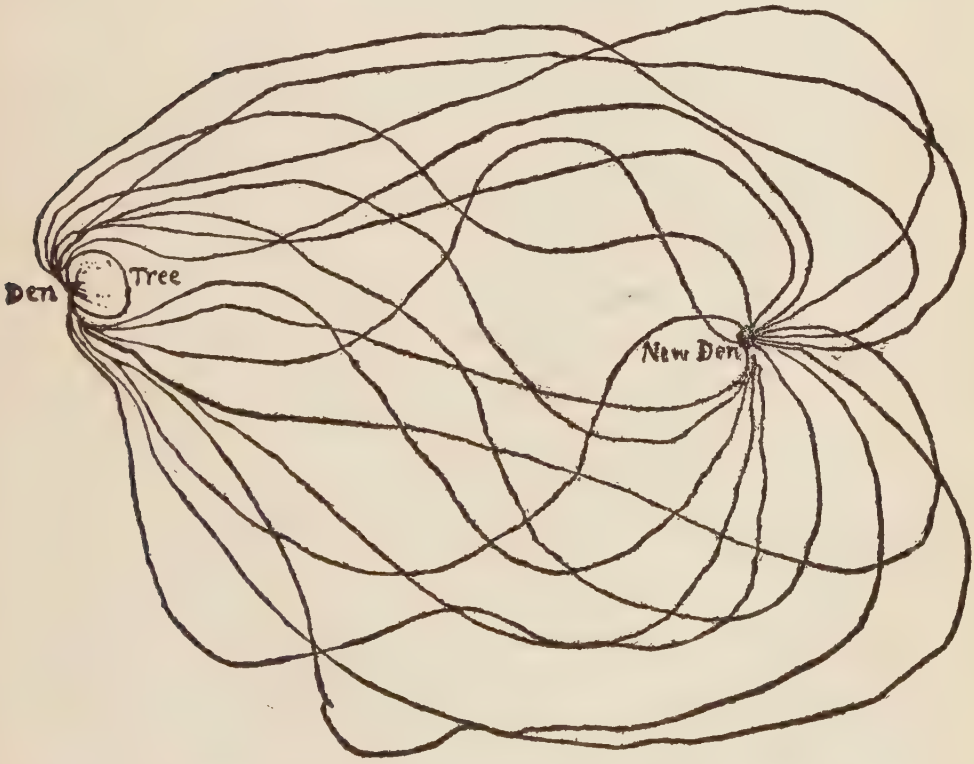


PLATE CIV—THE MOTHER FOX'S TRAIL

Diagram of fox-tracks (by G. L. Fordyce), showing approximately the tracks left by the mother Fox in moving her brood from the hollow tree to the new den

buzzing by, seized a sick Hare in his flight and carried it with him for a considerable distance. Another was surrounded in a field; he came out, attacked a wounded Hare, killed it before the eyes of the huntsmen, rapidly buried it in the snow, and then fled directly through the line formed by the sportsmen."[74]

This, of course, refers to the European Fox, but may be accepted as sidelight on our own.

These cases show, not only the nerve of the much hunted beast, but also the dominance of the storage instinct.

The unquestionable evidences, however, of superb courage, of the triumph of mind over matter, are to be seen in these instances given by American hunters.

C. M. Stark of Dunbarton, N. H., writes, Dec. 20, 1898, to *Forest & Stream*, some unusual experiences with a dog-Fox, a small one, as it was found ultimately to weigh only 11½ lbs. With the assistance of an experienced hound, Stark had started a Fox. The hound "became very much excited, and for some time acted like a fool, losing the track and trying to run the wrong way. I got him straightened out after a while, but in the meantime the Fox had got quite a lead, and had been on stone walls, over bare ledges and such places, and the Dog had to work hard to follow the track. As it was a pretty open country with large, bare hills, I could watch the Dog, although at some distance most of the time, and he worked well, getting mixed up now and then with some other tracks. I did not try to help him out, as I wanted to see just what he could do.

"After a while he jumped the Fox, and evidently was very close to him at the time. For a few moments after jumping him, the Dog barked and yelped very fast, and I saw both Fox and Dog. They were in an open pasture about 50 yards apart, in plain sight of each other. Suddenly the Dog stopped barking, and Fox and Dog cantered along slowly for about 50 yards, when the Fox stopped, turned around, and looked at the Dog. The latter also stopped. Then the Fox sat down and so did the Dog, some 50 yards apart, looking at each other. This was not very entertaining to me, as I wanted to shoot the Fox, but he was at least 3 gunshots away.

"After a while the Dog got up, put his tail between his legs and sneaked off, heading toward home. I then called the Fox up and shot him. As I was about to take off his pelt, the Dog came to me, having followed my track from where I left the road. He seemed very glad to see me, and

[74]Tierleben, Säugethiere, III, 1915, p. 173.

when I showed him the dead Fox, he bit and shook it a little, and did not seem at all afraid of it."[75]

Noble animal, that hound! Seventy-five pounds of Dog, and 11½ pounds of Fox! The hound dared not face the living Fox, but fearlessly bit and shook the pelt. How heroic!

The next testimony at hand is still more positive in character and still more satisfactory in conclusion. B. A. Eastman, of Barre, Vt., had bought some fancy-bred Fox hounds, most of which, however, showed a yellow streak. The best of them figured in the following incidents, related in *Forest & Stream*, May 6, 1899, p. 353.

"I had a Fox get out from its enclosure during the night. The hound was put on the trail and soon started it, running to a large field, the hound was not more than 4 rods behind, when, quick as a flash, the Fox turned and tackled the Dog. The Dog threw the Fox and held until taken away uninjured. This may explain why at times a Fox is caught by a hound when the chances of escape are easy."

On another occasion "we saw the Fox cross a field and enter the timber with the hound some 50 rods behind. In a short time we heard the Dog baying as if the game had holed. On going to the Dog we found he had caught and was barking at the Fox, not having the courage to kill it. Nor could the Fox get away. This Fox was not injured in any way, and the trailing was on bare ground.

"This would have remained a mystery, as did Mr. Stark's hunt, had I not had a similar experience a few years ago, which occurred in sight. I saw the hound start a Fox from under some shelving ledges in the open pasture. The Fox ran some 50 rods, coming within 20 rods of my stand, when it stopped and bristled up, with its ears lying flat on its head (much like a Cat on the approach of a Dog), and stood waiting for the Dog. The hound trailed up within a few feet of the Fox, but had not the courage to kill it. After a moment the Fox trotted away, the Dog in pursuit. I saw the Fox several times during the next hour. The hound was always 20 or more rods behind."

"Safety first" was evidently his motto, and I, for one, rejoice to think that that heroic Red-fox made good his escape.

### The Lasting Endurance of the Fox

It is not my plan to record hunts in which the men or the Dogs appeared to advantage, or returned victorious. The wild animal is my hero.

[75]Forest & Stream, Dec. 31, 1898, p. 532.

I wish to make known his fortitude, his steadfastness in the face of the most appalling odds. I did not intend to give any fox-hunts, as ordinarily understood. Yet I feel justified in quoting the story of "Boston and Baldy," which appeared in *Recreation Magazine*, July, 1898, pp. 3–7. The hunter who tells it, hides modestly under the name "Herb." I am assured by the editor, G. O. Shields, that it is true, and give it as it was told, but a little condensed, and in the last paragraph, changed to fit the findings of another witness.

PLATE CV.—A MOTHER FOX AND HER FAMILY

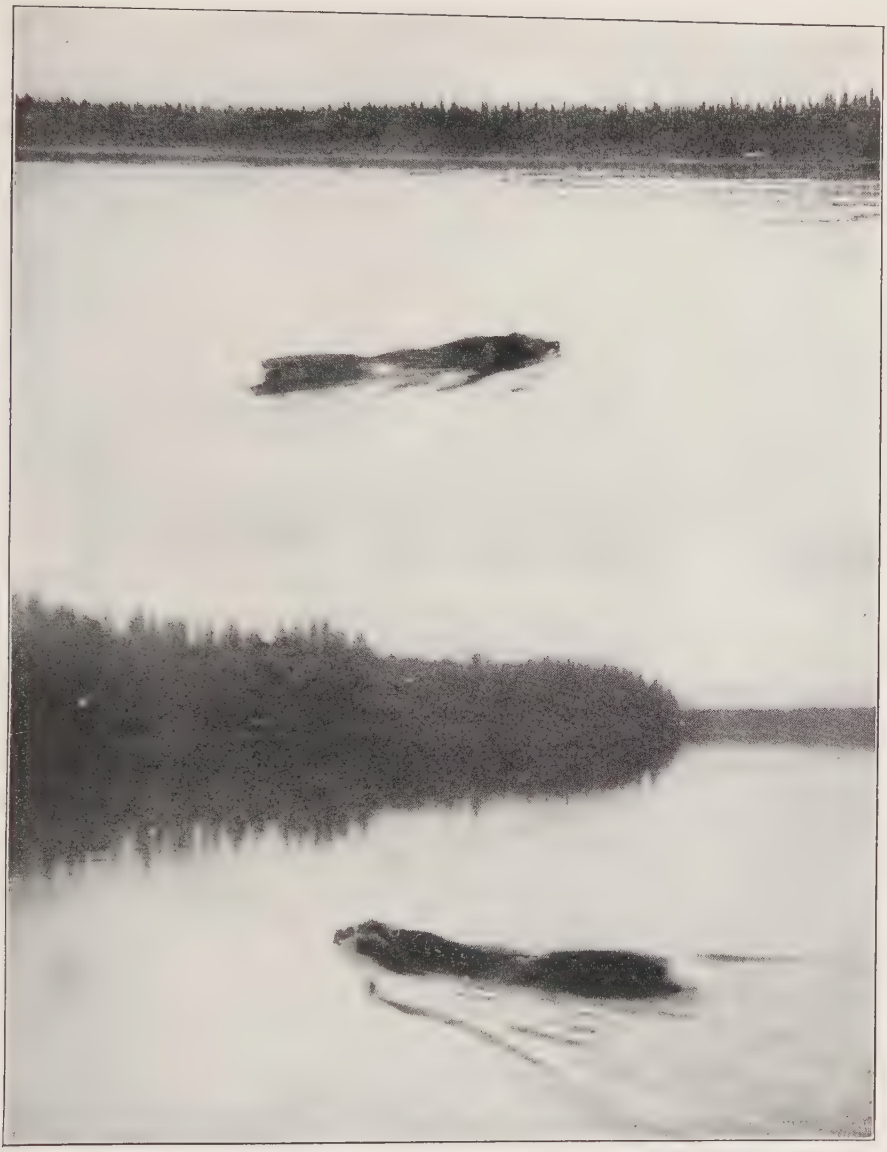

PLATE CVI.—FOX SWIMMING
Photographs by E. T. Seton, Great Slave River, Oct. 4, 1907

## The Story of Baldy

In old Virginia, on the James River in the late '80's, there lived Baldy, a famous Red-fox, known to all the hunters about by his great size and the big white patch on his cheek, from which he got his name. Every pack in the country had tried its mettle with Baldy, and had come back humiliated with failure. He was too strong, too long-winded, and too wise for the best of them.

In the December of 1887, the teller of this tale was back in Baldy's country, and had brought with him a new hound of illustrious pedigree, a thoroughbred, with the big mild eyes, the long, soft ears, and the foghorn voice that tell of bloodhound stock. The Dog was young, but had been in one or two hunts. In these he had done well but had given no evidence of unusual power.

One morning an hour before daybreak, a dozen hunters were in the saddle, and, blowing their horns, were off to the lowlands with their 27 superb foxhounds.

After one or two false starts by different Dogs, Boston, the blue-blooded, sounded a vibrant note that at once gripped the hunter-sense of the men.

Now let us take the story as the hunter himself told it.

"I at once 'hushed' the pack to him, and they began working up the river on a cold trail, but warming it at every jump.

"Following it a mile or so, still keeping to the bluffs, we came to a large gully down which the pack turned into the low grounds.

"As they reached a piece of corn stubble, they broke into full chorus. 'He is up and gone!' was the cry. What a moment of excitement! What a picture was unfolded to our eyes as from the bluffs we could see the pack straightening out along the false bank! A few hundred yards ahead of them, a flock of Crows were darting at something which we concluded was the Fox.

"The spell was broken by Captain D—— putting spurs to his Horse and yelling, 'Ride like the devil, boys, he will cross at the Point!' And ride we did. We cut a swath through the sassafras brush, that looked like the track of a tornado. At the edge of an opening, we paused to listen. The pack was almost out of hearing, still going up the river; but in a few moments, the Fox having doubled, we heard them returning. The word was passed,

'Keep still and we will see him!' When the pack was about opposite, and but half a mile away, out popped the Fox within 50 yards of us. We were in luck. It was old Baldy himself, patch and all. Away he went, his brush standing straight to the wind.

"Now all was commotion. Whose Dog was leading? we queried. What a chorus came up the hill! Is there any music to be compared with that of a pack in full cry?

"The first to appear in sight was Boston, his head up, and running like the wind. He was at least a minute in advance of the others, and was only opening once in each hundred yards. The rest of the pack was well bunched. They were led by my Dogs Tempest and Colonel, who were running neck and neck. We swung in behind them, cheering like mad. After 6 or 8 miles of very rough riding, we heard the Dogs stop. There were only 4 of us up then; the rest having been thrown out. We rode up to where we expected to find Old Baldy's torn and mangled remains, but found instead that the Dogs had lost his trail.

Here we circled for a while without a strike, but at last Forest, an old Coon Dog of mine, 'hit it off.' That darned Fox had taken to fence-running. Forest followed him along the fence for at least half a mile. Then we again lost the scent in a field where Old Baldy had run through a flock of Sheep. In vain we circled the enclosure. We thought we had lost him for the day and decided to call the Dogs off and return home.

"As we reached the main road we met an old Negro who said he had seen a Fox cross the road about a mile above. We rode up there and some of the Dogs opened, but the scent was cold. We kept up a constant cheering to encourage the pack. After 10 or 15 minutes spent in this way, and just as we were about to give up, we heard a series of squeals. Looking up we saw Old Baldy flying along the road, with Tyrant, Boston, and Black close behind him.

"'He is ours!' I yelled. 'He can never get away from those Dogs in a sight race.'

"But I did not know Old Baldy yet, for he simply faded away before the Dogs.

"In a moment we had the pack all in. Away we went again as fast as our tired Horses could take us. We kept with the Dogs for nearly an hour, but at last they ran out of hearing. Following more slowly, we met a friend who asked us into his house to partake of refreshments. He also had the kindness to stable our Horses, and generously lent us fresh mounts.

"After resting half an hour, we again moved up the river, hoping to meet the pack returning We kept on, mile after mile, but did not get

within hearing again. We met 8 or 10 of the oldest and youngest Dogs, who had quit and were coming back.

"About sundown we rode to a large plantation, and inquired if the pack had been seen. We were told that both the Fox and Dogs had passed an hour before. The Fox had a long lead, and was running well, with his brush still to the wind. We were nearly 35 miles from home; so we decided to remain where we were, if we could be accommodated. The owner of the plantation invited us to remain over night. Putting up the Dogs and Horses, we repaired to the house, where we demolished a substantial supper. As we were about retiring, one of the servants came in and told us there were some Dogs going down the river, howling. We took our horns and going out on the lawn, blew the Dogs in, putting them with the rest.

"About 6:30 the next morning, as we were finishing breakfast, a servant came running in with the information that a Fox with one Dog close behind him, and 2 others some distance after, had just gone down the river.

"Bidding our host good-bye, we saddled our Horses and went on down to the low grounds. We did not hear or see anything of the chase until we arrived at the place where we had left our Horses the day before. While waiting the saddling of our then well-rested mounts, one of the Negroes said he had seen Old Baldy and 3 Dogs a short time before. The Fox was almost played, for his brush was dragging the ground. Our host having joined us, we rode on at a smart pace. A mile or so farther on, I saw by their tracks that Dogs and Fox had again gone to the bluffs. Soon we came up to Colonel, who was staggering along, completely worn out. I took him up on my saddle, and carried him onward. Two miles farther we overtook Rattler going down the road, howling every few yards. Bob took him up in front of him. Both these hounds were badly broken up, and *had worn the pads from off their feet.* A little later I heard a hound give tongue away down in a bottom to our left. I recognized it as Boston's cry, but it was a very weak and faltering note. Leaving the Dogs that were with us in an old tobacco barn on the road, with a Negro to watch them, we rode down to the bottom. There in a patch of briars in a small clearing we could see, by the shaking of the briar tops, the position of both Fox and Dog. They were about 20 yards apart. The Dog had ceased giving tongue except when cheered.

"Leaving our Horses, we went down along the edge of the path which was about an acre in extent. For an hour we saw neither Dog nor Fox. They kept doubling near the centre, but at last Old Baldy stepped from cover a few yards above us. He passed within 10 feet of us without even raising his head. His tongue, greatly swollen and almost black, hung from

his mouth. His brush was covered with mud, and was tightly tucked. A few yards away a large tree trunk had fallen across a path; this the tired Fox tried in vain to climb over. As he slipped back Boston came out of the bushes and saw him. The Dog raised his head and uttered one clear, long-drawn note, a cry of triumph, more expressive than words. As Boston staggered toward him, Old Baldy suddenly fell to the ground, where he lay limp and motionless. When within a few feet of his quarry, Boston stumbled and fell. Then he got up, staggered to the Fox, closed on him, and gave a feeble shake."

Gripped in that weak, final clutch, they went down together. Their poor, feeble struggling ceased as the men looked on, and together the two passed away to the Happier Hunting.

So ended one of the longest chases ever run. A day and a half it lasted; it covered not less than 150 miles in all, and was, at one time, fully 50 miles from the place where it began.

Without desecrating Baldy's body by removing the brush, they buried him with the hound. Side by side they lie on the spot where the long chase ended.

A noble hound! How the hunters did glory in him! But never a word had they for the nobler and gamier little Fox.

### References for Red-fox

1849—Quadrupeds of North America, by Audubon & Bachman, I, pp. 45–54; II, pp. 263–71.

1897—Enemies of Poultry, by B. H. Warren, M. D., pp. 376–414; 1 ill.

1902—American Animals, by Witmer Stone & Wm. E. Cram, pp. 264–72; 6 ills. N. Y.

1903—Mammals of Pennsylvania & New Jersey, by Sam. N. Rhoads, pp. 145–48.

PLATE CVII.—BOSTON AND BALDY

## LIFE XIII—THE KIT-FOX


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## Kit-fox or Swift

*Vulpes velox* (Say)

(L. *Vulpes*, a Fox; *velox*, swift)

*Canis velox* Say, 1823, Long's Exped. Rocky Mountains, I, p. 487.
*Vulpes velox* Audubon & Bachman, 1851, Q. N. A., II, p. 13.

Type Locality—Vicinity of Plum Creek, So. Platte River, Colo.

French Canadian, *Rénard des prairies, Rénard vif.*
Yankton Sioux, *Taghn-kay-ha.*
Ogallala Sioux, *Mee-yah'-chah.*
Mexican, *Coyotíto.*

One of the Indian names of the species is said to mean "lousy thing," because it is pestered with lice.

In addition to the characteristics of the genus *Vulpes*, the Kit-fox has the following:

*Size.* Length, 26 in. (660 mm.); tail, 9 in. (228 mm.); hind-foot, 4 in. (102 mm.).

*Weight.* A full-grown specimen, from Medicine Hat, Sask., weighed 4¼ lbs. One which I took at Clayton, N. M., weighed 5 lbs. 10 oz.

*Colour.* General colour, pale buffy-yellow, becoming a deeper yellowish brown on the back of the ears across the lower neck, on the outside of fore-legs and back of hind-legs; below, it is nearly white; on each side of the snout is a black spot; the back is covered with a beautiful silvery-gray mantle in which the gray-brown under-fur is peppered and frosted over with conspicuous white and inconspicuous black tips of the long hairs; this silver-tipping is continued on to the snout. The tail is warm yellowish-gray above, strong yellowish below; the *tail-tip is black.* The tail gland is marked by a black spot, as in the other species. *There is no black on the ears.*

It may be distinguished from its nearest relatives, the Big-eared Swift, by its yellower colour and shorter ears (see Plate CXI).

### Races

Two races are recognized:

*velox* Say, the typical form. T. l., South Platte River, Colo.

*hebes* Merriam, larger, paler, and grayer. T. l., Calgary, Alberta, Canada.

## Fur

The fur is of little commercial value. At Lampsons' sales in London, 1905, a total of 5,129 Kits were sold.

In the March sale of 1906, the number fell to 1,404; 5s. 6d ($1.32) was the highest price paid, and 1s. 3d (30 cents) the lowest.

In the Canadian Government Fur Lists, the Kit-fox is entered as "Fox, other," and the number taken:

| | | |
|---|---|---|
| 1919–20 . . . | 386 . . . | value $5,549; average $14.63 |
| 1920–21 . . . | 61 . . . | value 258; average 4.23 |
| 1921–22 . . . | 214 . . . | value 1,311; average 6.21 |

These came chiefly from Alberta with a very few from British Columbia. In Saskatchewan and Manitoba the species is extinct.

## Range and Haunts

This diminutive Fox, no larger than a House-cat, is a characteristic native of the Saskatchewan or upper Campestrian region.

In Manitoba, it was formerly found in the Pembina Hills and westward to the Souris. Alexander Henry, trading on the Red River in 1800–08, had one or two Kits brought to him from Pembina Hills, or, as he calls them, Hair Hills, nearly every season. One year, 1804–05, he had 57; of these 26 were from Pembina Hills and 31 from Salt River.[1] In 1873, Dr. E. Coues found Kit-foxes common along the Souris River at the Boundary Trail.[2]

The Kit-fox is strictly a prairie animal, harbouring in burrows and never venturing far from them, so that it is the most subterranean of our Foxes.

## Mating, Dens, and Young

Nothing is known of its mating beyond the fact that the creature pairs and that the pair continue together all summer, probably for life, as the male is active in the care of the young.

One of my guides, Lee Hampleman, of Meeker, Colo., tells me that in 1897, when on Pawnee Creek, Colo., he found a Swift's den. It was reached by a tunnel about 9 feet long and was 5 feet from the surface.

[1] Journal, pub. 1897, p. 259 (See Lynx References).

[2] U. S. Geol. Surv., 1878, vol. IV, bull. 3, art. XXV, p. 547.

The chamber was nicely lined with grass and contained 5 young ones. "Just the cutest, prettiest things he ever saw."

These were taken home to the ranch and easily raised, but they never became tame. Both parents were seen about the den.

Prof. John Macoun relates that in Alberta, June 16, 1895, he saw 2 old Kits and 5 young sitting on a prairie knoll. His Dog rushed at them; the young dived into a hole, and the parents busied themselves leading the Dog elsewhere.

An interesting account of a pair of Kits that lived near his ranch house has been given me by R. W. Cowan, of Cochrane, Alta. They were such beautiful and playful creatures that he rather encouraged them until they began to kill chickens, whereupon they fell from favour and paid the extreme penalty. The family consisted of 2 old ones and 5 young. The latter began to run in the month of May. The old ones were seen together the year around, and during May the father certainly lived in the den with the family.

## Habits

These Alberta Kits were known to prey largely on Mice, and when there was snow on the ground, they several times showed great cleverness in catching the prairie-chickens that slept in the soft drifts.

At one time the Kit-fox was believed to be the speediest four-foot on the Plains. This, however, proves to be an error. It is very swift, no doubt, but a small animal always appears to be going faster than it really is, and the rapidity with which it gets up speed and disappears into a hole when startled helps to give a wrong impression of its velocity. In the scale of speed, I should place it a little higher than the Coyote.

In captivity it is easily managed and breeds freely, yet continues shy. Audubon and Bachman relate of a captive specimen: "He drank more water than Foxes generally do, seemed anxious to play or wash in the cup which held his supply, and would frequently turn it over, spilling the water on the floor of his cage."[3]

## The End

Exquisitely beautiful is the little Swift-fox when seen on his native plains, in all the glory of his sleek autumnal coat. Harmless as a Rabbit is he—harmless to man and mankind's interests; and yet he is going fast with all the other innocent and lovely wild things. Yes, faster than most, for he is the least cunning of our Foxes—so guileless that he readily takes the poisoned baits used nowadays for killing Coyotes.

[3] Q. N. A., 1849, II, p. 16.

PLATE CIX.—LIFE STUDIES OF VARIOUS FOXES
By E. T. Seton

But other and even deadlier forces are at work.

I have before me now the current issue of a well-known sporting magazine. It consists of 8 articles (14 pages) on how to destroy game, etc.; one article (2 pages) on how to preserve ducks; 2 articles totalling 5 pages on camping. Thirty-two pages are devoted to announcing new devices for the destruction of game and wild life, including 50 advertisements of various Dogs trained to kill or help kill game with new and increased effectiveness. This publication is an accurate index of the thought and methods of to-day.

One hundred years ago the balance turned. Then the total of man's destruction became greater than the reproductive power of the game animals. And yet, we have yearly added to that destruction, and foolishly we wonder why the wild life goes so fast. Now is the time for a decision. We must either abolish repeating weapons, high-power guns, steel traps, poison, Dogs, automobiles, and aeroplanes in all pursuit of game and harmless creatures, or accept the desolation of our woods and wilds, that at the present rate will certainly be complete within a few years.

## LIFE XIV—THE DESERT FOX


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## Desert Fox, Desert Kit-fox, Swift Fox, Big-eared Fox, Long-eared Fox, Arizona Swift

*Vulpes macrotis* Merriam

(L. *Vulpes*, a Fox; *macrotis*, from Gr. *macros*, big; *otis*, ear)

*Vulpes macrotis* Merriam, 1888, Proc. Biol. Soc. Wash., IV, p. 136, Feb. 18

Type Locality—Riverside, San Bernardino County, Calif.

Mexican, *Zorra*

When seen alive, the Desert Fox seems much like the Kit-fox, but it is usually paler in colour, and has conspicuously large ears. It is easily distinguished from Gray-fox and Red-fox by general pale colour, small size, and the absence of any pure black or pure white on its coat.

I can find no definite colour feature that will always distinguish it from *velox*. Both have the same sandy or buffy white general colour, which is intensified on the legs; and both have a mantle of peppered gray. But the *velox* is a more strongly coloured animal; and *macrotis* has much larger ears. In size, they are about the same. No doubt the present will be proven a mere race of *velox*.

*Size.* Total length, about 30 to 33 in. (760 to 830 mm.); tail, about 11½ in. (292 mm.); hind-foot, about 4¾ in. (121 mm.); ear from crown, about 3¾ in. (95 mm.), instead of 2⅛ inches as in the northern Kit-fox. Thus its ear is half as long again as that of a Red-fox, which weighs 2 or 3 times as much; and nearly twice as long as that of its nearest relative, the northern Kit-fox. (See Plate CXI.)

The ♀ is somewhat smaller, being about 26½ in. in total length.

*Weight.* About 4 lbs.; but a large ♂ from Cliff, N. M., was 5¼ lbs., and a *velox* from Clayton, N. M., was 5 lbs. 10 oz.

*Colour.* In general, of a soft, buffy yellow, which becomes deeper on the ears and outsides of the legs, paler on the under parts, and pure white on chin, throat, and belly. Head and mantle, peppered gray, with warm under-fur showing through at places. The tip of the tail and the spot marking the tail-gland on the base above, dark brown; whisker bed, dusky.

Sexes alike.

PLATE CX.—COLORADO KIT-FOXES, NATIONAL ZOO
Photographs by E. T. Seton, 1923

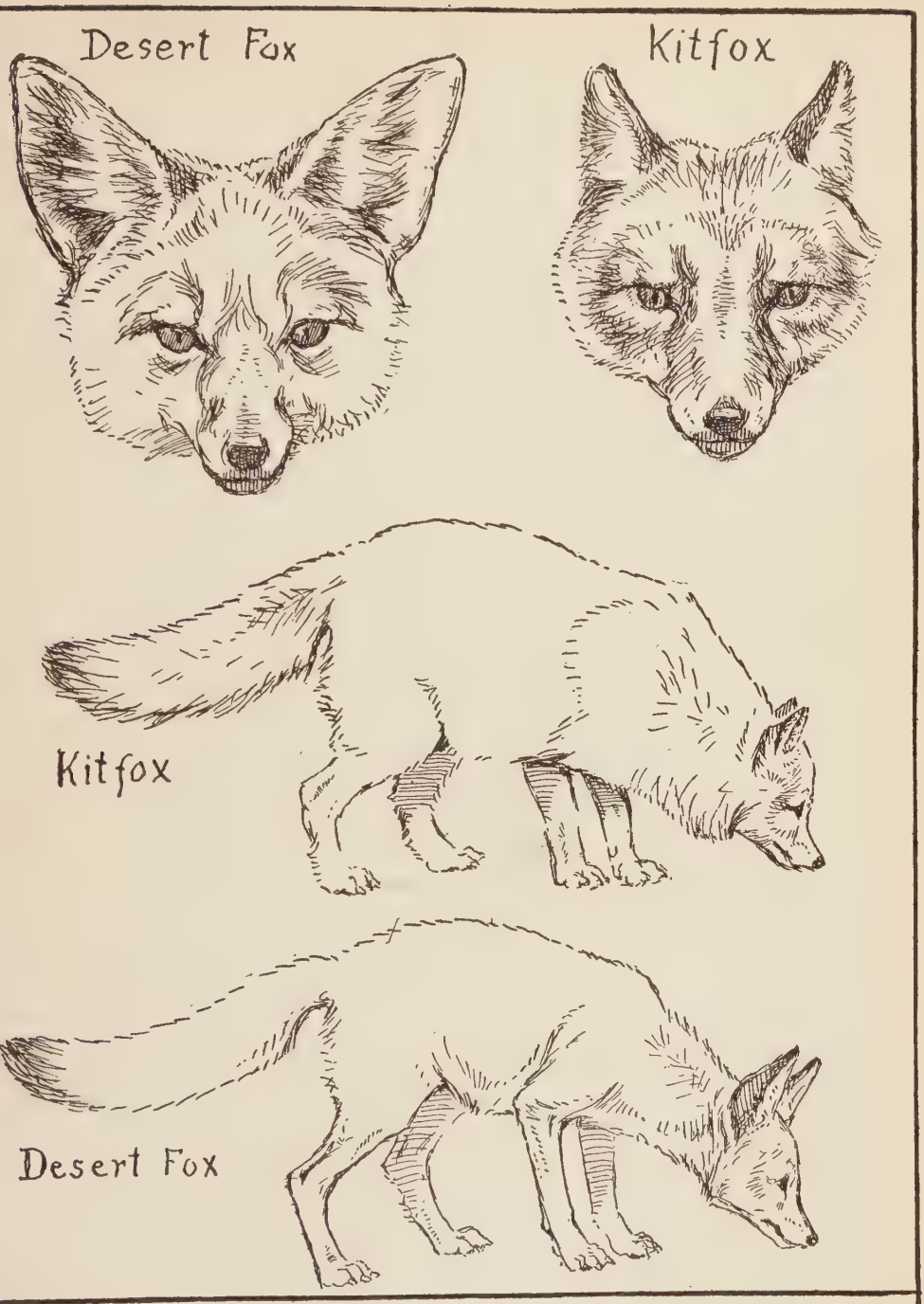


Plate Cxi. Desert & Kitfoxes, compared
E.T.S.

### Races

The following closely related forms have been recognized:

*macrotis* Merriam, the typical form. T.l., Riverside, Calif.
*neo-mexicanus* Merriam, a large, yellowish animal. T. l., San Andreas Range, N. M. (about 50 miles north of El Paso, Tex.)
*mutica* Merriam, a large, richly coloured form. T. l., Tracy, San Joaquin County, Calif.
*arsipus* Elliott, like *macrotis*, but paler and smaller. T. l., Daggett, San Bernardino County, Calif.
*devia* Nelson & Goldman, similar to *macrotis*, but much darker; usually blackish on sides of nose and under jaw; pelage shorter. T. l., Llano de Yrais, opposite Magdalena Island, Lower Calif.

The English zoölogist, St. G. Mivart, considers that all of these are merely geographical races of the Northern Kit-fox (*Vulpes velox.*)

Its most conspicuous peculiarity is its large ears. It is interesting to note that the similar but larger environment of Africa has produced in the Fennec exactly the same thing on a larger scale.

A parallel exaggeration of the ears is seen in the desert forms of Mule-deer, Jackrabbit, and Rockmouse.

This beautiful creature, though not rare in its region, is so seldom seen in daylight that it long remained unknown. Its first introduction to science was in 1888 as already noted.

### Range and Food

On the Great Mohave Desert I found the Desert Fox common; that is, I found its foot tracks common every morning. And the abundant small game of the chaparral and creosote country evidently supplied it with plenty of food. What evidence we have, shows that it preys on Kangaroo-rats, Mice, and Ground-squirrels, but it would not be true to the family tradition if it did not add to this list birds' eggs, reptiles, insects, and fruit.

### Voice and Habits

Its voice is often heard across the cactus plains on the still starry nights, sounding much like the screech of one of the owls. Though at other times it reminds one of the Red-fox's bark—on a small scale.

PLATE CXII.—DESERT FOX
Photographs by Biological Survey, U. S. Dept. Agriculture
Taken by Dr. T. S. Palmer

PLATE CXIII.—GRAY-FOX, IN PHILADELPHIA ZOO
From photograph by E. T. Seton

### Mating, Young, and Blameless Life

The mating season is believed to be about the first of February. Prof. Chas. T. Vorhies writes me that on Feb. 6, 1918, he secured a female "which contained 3 small embryos, each about $\frac{5}{8}$ inch in length."

The little ones are born about the middle of March and are from 3 to 5 in number.

Vorhies writes me further of a family that he observed on the Range 35 miles south of Tucson, Ariz.:

"On April 28, 1918, while preparing for the fencing of experimental areas on the Range Reserve, a Swift was observed at a distance of only 100 to 150 yards, watching the two of us who were present. I secured the rifle from the car at a little distance away, and crept toward the place, finding, to my surprise, that the animal was lying as if asleep at the mouth of the burrow. This was about 4 P. M. I fired and killed the animal; it proved to be a male.

"The area about the mouth of the burrow showed plainly the presence of a litter of young, and I was glad to know that I had not killed the mother.

"This burrow was occupied for some weeks, but later in the summer was abandoned, probably as a result of the proximity of the fencing operations and the disturbance of the family by the shooting of the male. The fence passed within 25 or 30 yards of the den. Being new to the Range, I did not fully realize the unusual opportunity afforded by this den. Under similar circumstances now, I would leave the entire family undisturbed for close observation. I have not had the good fortune to again locate a Swift den."

The analogy of other Foxes leads one to believe that the male is a devoted parent, faithfully doing his duty by the young, and helping his wife with food when she is unable to hunt. But all of these matters have been little observed, and good service can be done by the young naturalist of the Southwest, who will make for us a fully detailed life-history of the beautiful little Desert Fox.

# LIFE XV—THE GRAY-FOX


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Twixt Cat & Fox.

## Gray-fox, Virginian Fox, Tree-fox, Mane-tailed Fox, Grayback, or Colishé

*Urocyon cinereoargenteus* (Schreber)

(Gr. *oura*, tail; *cyon*, Dog, "dog tail," from the tail which has a concealed mane of stiff hairs without any soft fur intermixed; *cinereoargenteus*, ashy silvered)

*Canis cinereoargenteus* Schreber, 1775, Säugthiere, III, pl. 92.
*Urocyon cinereoargenteus* Rhoads, 1894, Am. Nat., XXVII, p. 524, June.

Type Locality—Eastern North America

Mexican, *Zorro*[1]
Apache, *Colishé*[2]

The genus *Urocyon* (established as a subgenus by Baird, 1857) of which the Gray-fox is the type, differs from *Vulpes* chiefly in the facts that it has "tail with a concealed mane of stiff hairs, without any soft fur intermixed [a feature common in some degree to all the American *Canidæ*]; muzzle, short; temporal crests, always widely separated. A supplementary tubercle on the lower sectorial. The under jaw with an angular emargination below. *Urocyon*."[3] Each of the characters, however, is found also in Vulpes though in a rudimentary form (see pp. 477 and 481).

Both in his Pacific report (1857) and in his Mexican Boundary Report (1859) Baird treats this Fox as *Vulpes virginianus*, that is, he did not consider its characters strong enough to warrant its being put in a separate genus, though he suggested the name *Urocyon* for the "group."

The tooth formula is as in *Vulpes*.

When seen alive, the Gray-fox looks like a common Red-fox, wearing a grizzly gray overcoat and cap; but his tail is more or less black and has a *black tip;* on each side of his snout is a black whisker-bed.

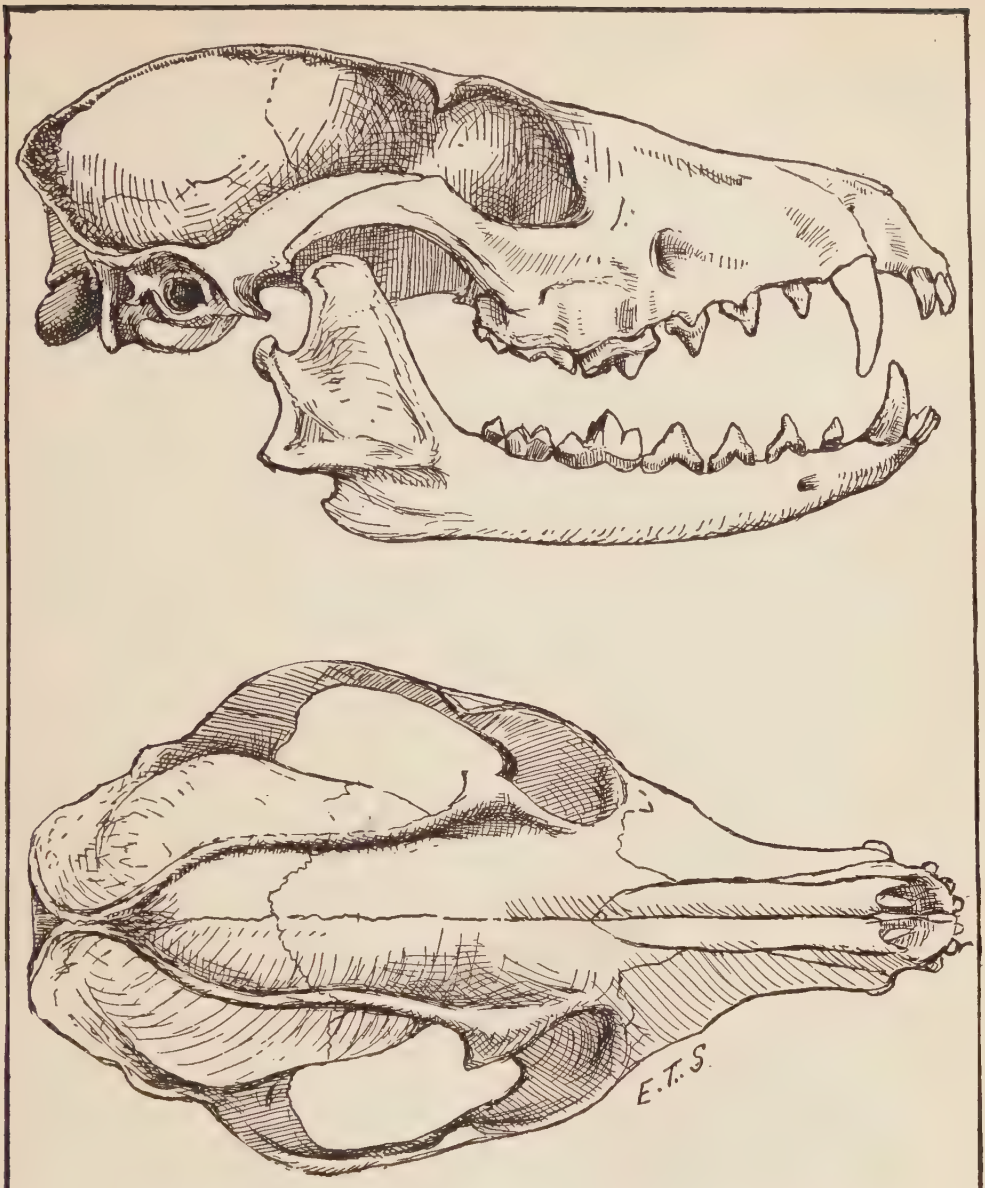
The Red-fox is easily known by its bright reddish orange coat and black gloves and boots, black ear backs, and white throat and *white tail-tip*.

The Kit-fox and its big-eared kinsman, the Desert Fox, are known by

[1] C. B. Kennerly: Baird's Mamm. Mex. Bd., p. 17.

[2] As above.

[3] Mamm. Pac. R. R. Rep., VIII, 1857, p. 121.




Genus Urocyon

Plate. Cxiv. Skull of Grayfox ♂ (californicus)
American Museum 30208

their small size and soft buff colour, slightly silvered with gray on the back; and by the black tail-tip. Like the other two, the Kit and Desert Foxes have each a dark whisker-bed on each side of the muzzle.

To the generic characters, the Gray-fox adds the following:

*Size.* Total length, 39 to 41 in. (991 to 1041 mm.); tail, 11 to 12½ in. (280 to 318 mm.); hind-foot, 5 to 5½ in. (127 to 140 mm.).

*Weight.* Probably about 8 lbs. but not recorded. Donald R. Dickey reports "a young, but apparently adult ♂ of *californicus* from San Diego County, Calif., taken Feb. 4, 1913, measuring 920 x 410 x 123 and weighing 7 lbs."

*Colour.* All above, bright, clear, coarse pepper-and-salt, with the warm buffy under-fur showing through. The ears, sides of head, and neck and legs, strongly tinged with deep brownish orange; the flanks, insides of legs, anal region, and under side of tail of the same colour but paler; a sort of Coon mask of dark brown runs from eye to nose. Ears inside, cheeks, throat, and all below, pure white, the sides of the muzzle, chin, mane on tail, black. *Tip of tail, black* always, whereas in the Red-fox group it is always white.

This description is founded on a fairly typical October ♂ from Hastings, N. Y.

An interesting variant is recorded by Bachman who had for many years a beautiful specimen of the Gray-fox "which was barred on the tail like the Raccoon, and had a dark cross on the back like that of *Canis crucigera* of Gesner."[4]

So far neither white ones (albinos) nor black ones (melanos) have been recorded.

The mane on the upper line of the tail is the chief outward anatomical distinction of the Gray-fox as compared with the Red-foxes; it is composed of rather coarse hair like that on the shoulders, but lacks the woolly under-fur.

This mane I discussed as follows in the *Journal of Mammalogy*, Aug., 1923, pp. 180–82.

Since it is not generally known that all of our Canidæ are more or less equipped with this over-emphasized mane, I have made studies to represent the chief groups of the family found in North America. I am glad here to thank the American Museum of Natural History for supplying me with the needed specimens and every facility for study.

The mane, it will be remembered, is composed of stiff hairs without any under-fur. It is well known that all of our Canidæ have a musk-

[4] Q. N. A., I, p. 163.

gland on the upper side of the tail near the base. The use of this is almost certainly for communication with others of his kind and is the personal label of the individual. It is his identification disc.

This gland is usually marked with a bunch of black-tipped hairs which spring from the area of skin which bears the gland, and are not mixed with under-fur. The absence of under-fur over the place where the sebaceous glands are so highly specialized is doubtless more than a mere coincidence.

No attempt was made to select these specimens except to get males and those fully labelled. The Gray-fox used had a mane and gland $4\frac{1}{2}$ inches long; but the next Gray-fox, also a male, had but 3 inches of mane and gland. So like all specialties it is highly variant. The peculiar shapes shown are individual; that labelled "Red-fox" seems to be the general type. A plan of each gland is given directly under the tail it belongs to, and on the same scale. In the upper part of the Plate is a life-size plan of each gland.

### Tails Shown on Plate CXV

A, *Vulpes fulva* ♂, Fort Montgomery, N. Y. Am. Mus., 16672. Tail, $14\frac{1}{2}$ in. long; gland and mane, 1 in.

B, *Alopex ungava* ♂, Cape Fullerton, Hudson Bay. Am. Mus., 19481. Tail, 11 in.; gland and mane, $1\frac{3}{8}$ in.

C, *Canis latrans* ♂, Maple Creek, Sask. Am. Mus., 28270. Tail, $12\frac{1}{2}$ in.; gland and mane, $1\frac{1}{2}$ in.

D, *Canis occidentalis* ♂, Neutral strip, Oklahoma. Am. Mus., 6781. Tail, 14 in.; gland and mane, $1\frac{1}{2}$ in. In another specimen it was 1 in. wide and 3 in. long.

E, *Vulpes velox* ♂, Calgary, Alta. Am. Mus., 15871. Tail, $11\frac{1}{4}$ in.; gland and mane, $2\frac{7}{8}$ in.

F, *Urocyon cinereoargenteus* ♂, Hastings, N. Y. Am. Mus., 3825. Tail, $14\frac{1}{2}$ in.; gland and mane, $4\frac{1}{2}$ in.

### Races

The following forms of Gray-fox have been recognized:

*cinereoargenteus* Schreber, the typical form. T. l., Eastern North America.

*borealis* Merriam, like the type, "but decidedly larger, with marked tooth and skull differences." As large as a Red-fox. T. l., Marlboro, N. H.

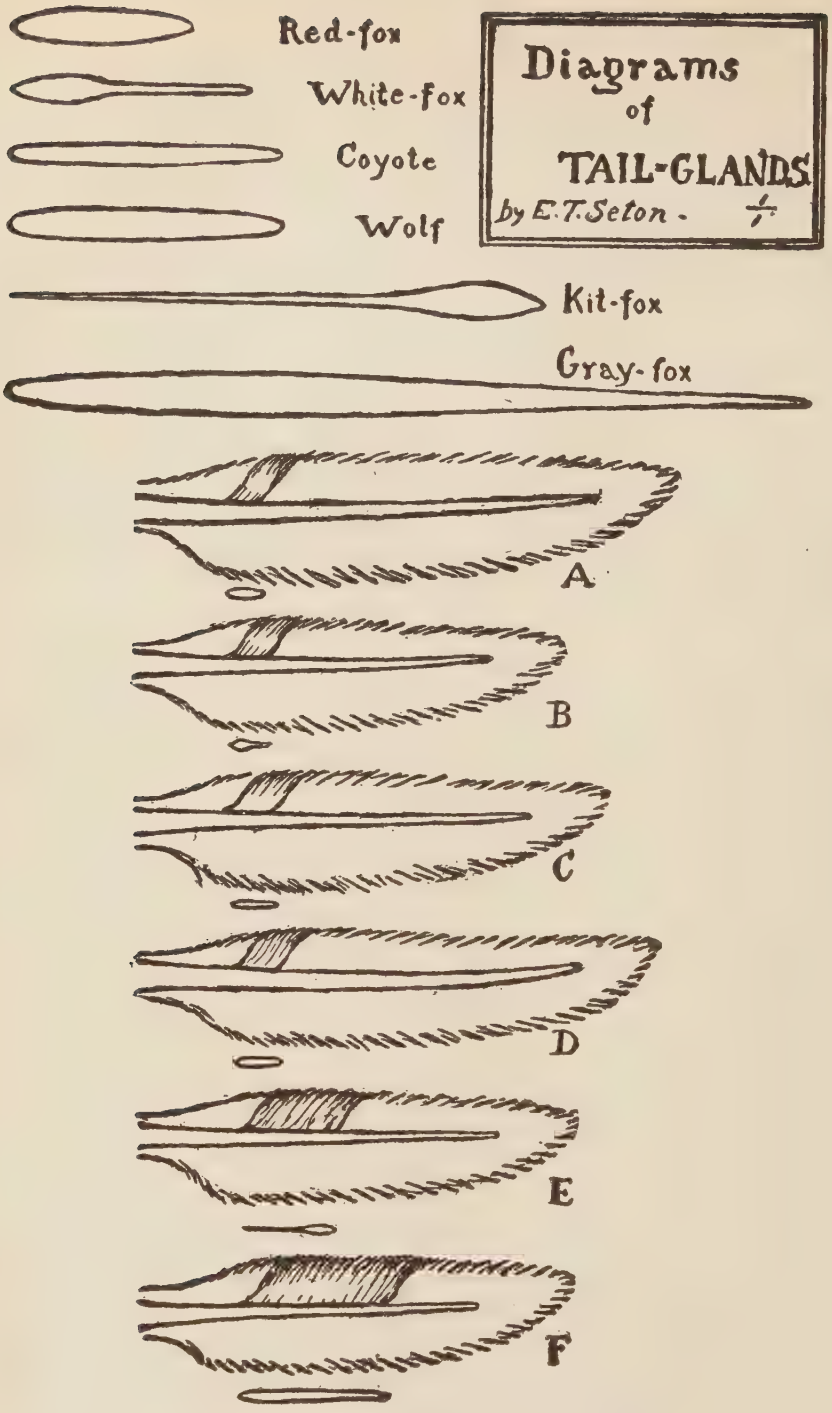



PLATE CXV—TAIL-GLANDS OF CANIDÆ

*floridanus* Rhoads, smaller than the type; hind-foot, tail, and ears shorter; pelage, shorter, harsher, and paler; the white of the under part is yellowish. A faded-looking creature found as far west as Big Thicket, Tex. T. l., Tarpon Springs, Fla.

*ocythous* Bangs, like the type, but paler, with longer ears and tail, and thinner muzzle. T. l., Platteville, Wis.

*californicus* Mearns, much like *cinereoargenteus*, but smaller and paler with larger ears and relatively longer tail. T. l., San Jacinto Mountains, Calif.

*sequoiensis* Dixon, like *californicus*, but larger and with fulvous areas much more intense in colour and more extensive. T. l., Lagunitas, Calif.

*townsendi* Merriam, like *californicus*, but much larger, with ears decidedly smaller; in colour, intermediate between the two foregoing. T. l., Baird, Shasta County, Calif.

*scottii* Mearns, like *cinereoargenteus*, but more slender with longer ears and tail, and paler colours. T. l., Penal County, Arizona.

*guatemalæ* Miller, a very small pale race. T. l., Nenton, Guatemala.

*fraterculus* Elliott, a small dark race. T. .., San Felipe, Yucatan.

*parvidens* Miller, like *fraterculus*, but with smaller teeth and shorter tail. T. l., Merida, Yucatan.

*inyoensis* Elliott and *texensis* Mearns, are not considered valid races.

The Santa Barbara Islands, off the coast of California, are credited with a surprising array of pygmy Mane-tails. These have been long enough marooned to beget each some local and insular peculiarities.

They are so much smaller than those of the mainland that any one can distinguish the islanders at sight, but when it comes to separating one island form from another, it is a different and purely technical matter. Sportsmen will find it best to name each after the island where it was taken, and leave to scientists the discussion of their minute differences.

The following have been listed:

*littoralis* Baird, a dwarf, otherwise like *californicus*. T. l., San Miguel Island.

*littoralis santacruzæ* Merriam, similar to the foregoing, but of brighter colours and with slenderer skull. T. l., Santa Cruz Island.

*clementæ* Merriam, like *littoralis*, but skull smaller, nasals more

tapering behind, muzzle more slender. T. l., Santa Clemente Island.

*catalinæ* Merriam, like *littoralis*, but tail longer, nasals narrower and not constricted in the middle, muzzle longer. T. l., Catalina Island.

Mexico is within the range of the Gray-fox, forms having been described from Yucatan and Guatemala, as well as Colombia; but little is known of their range or affinities.

As one compares the above races, the sandy paleness of the Arizona form, the silvery brightness of the Californian, and the pygmy proportions of the islanders are very striking indeed, but the creatures show the same pattern, the same general colour scheme; and, obviously, all are the same animal just as surely as they manifest the same habits from New Hampshire to Florida, and from Virginia away west to the islands of the sea.

## Range

The Gray-fox is a perfect respecter of the altitudes and the zone-laws laid down by our Biological Survey. Indeed, he is a model in this matter. As soon as—yes, sooner than—a faunal area is mapped, he accepts it and sets to work to develop a race that will fit. His adherence to the Carolinian in the East and the lower Sonoran in the West is modified chiefly by the presence or absence of forests, though in California, Dickey writes me, the species is found up to high Transition in the mountains.

Like the Gray-squirrel, the Gray-fox is perfectly able to take care of himself, provided we do not rob him of his mother woods. This, however, we are doing fast. Nevertheless, he still maintains the unequal fight; in some regions, he is even spreading his range a little wider.

The following notes are evidence of the Gray-fox scouting parties reaching new, far, possible woods.

In 1897, Rhoads writes that, though rare in the northern parts of Pennsylvania, the Gray-fox now visits every township in the State. This could not have been said 20 years before.[5]

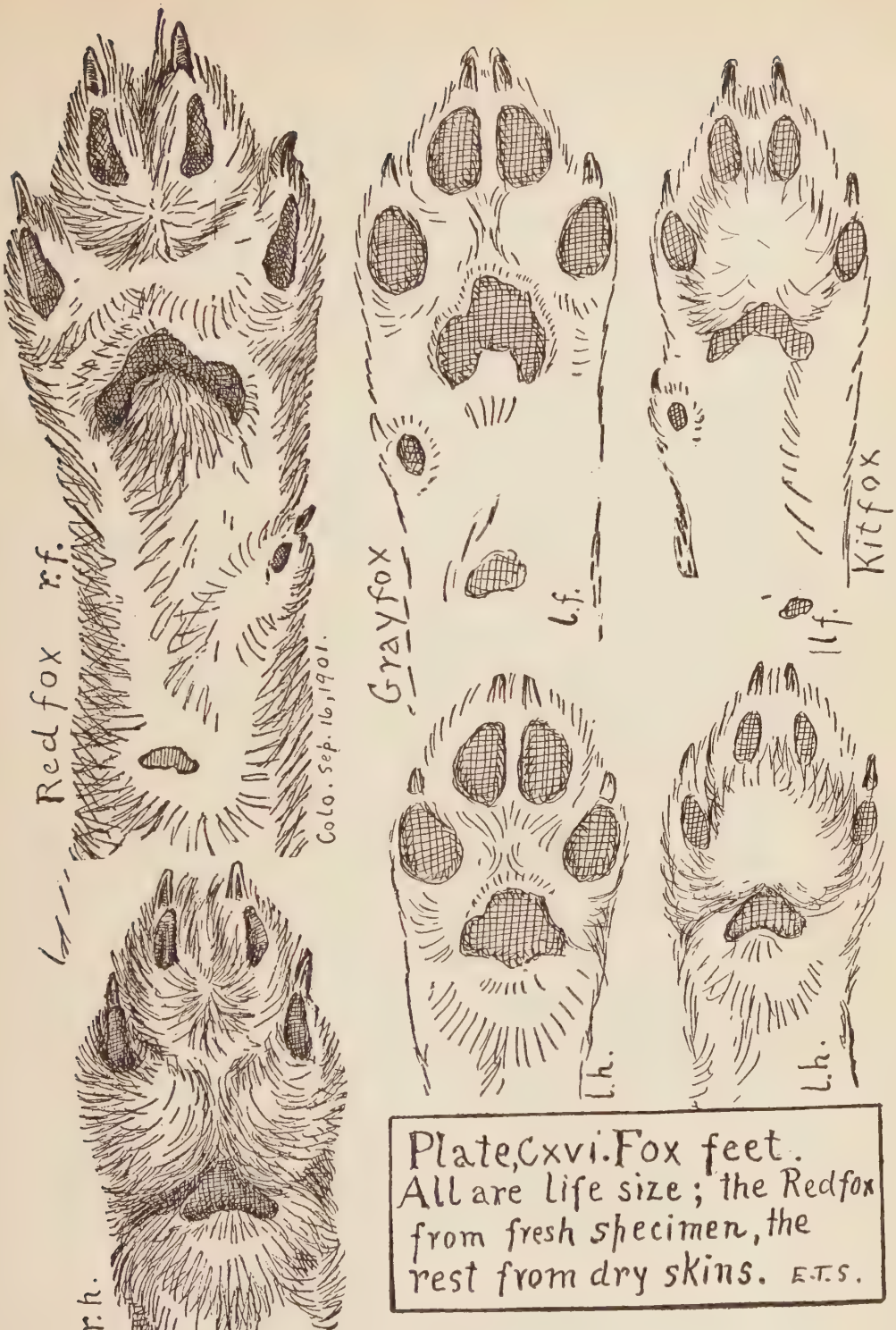
In Michigan, according to Norman A. Wood, it has been recorded from nearly all parts of the Lower Peninsula and from Gogebic and Delta counties in the Upper Peninsula which is beyond its proper map.[6]

J. E. Marshall reported in 1911 that the Gray-fox was rare in the region, but that he had trapped 2 near Gogebic Lake.[7]

[5] Mamm. Cent. Penn., p. 220.

[6] Mich. Mamm., April 1, 1914, Univ. Mich., p. 9.

[7] Dice & Sherman: Mamm. Gogebic, Mus. Zoöl., Univ. Mich., Feb. 25, 1922, p. 27.




Plate, Cxvi. Fox feet.
All are life size; the Redfox from fresh specimen, the rest from dry skins. E.T.S.

On the other hand, there is some evidence that its northward range has shrunken. In the *Canadian Field Naturalist* for Jan., 1921 (pp. 19–20), is an article by W. J. Wintemberg, announcing the find at Uren Village Site, South Norwich Township, Oxford County, Ont., of several lower jaws and part of a skull of Gray-fox (*Urocyon*) identified by Dr. G. S. Miller of U. S. Nat. Mus. The species seems to have been as common there as the Red-fox. P. A. Taverner of the Ottawa Museum tells me that a specimen was recently taken at Point Pelee, Lake Ontario.

### Haunts

In spite of some contradictory testimony, the Gray-fox seems to be more truly a forest animal than the Red-fox. It is notorious that Red-foxes always increase with partial settlement, but the Gray-fox is at home only in the unbroken forest or in the roughest of rock and brush land. As will be seen, he is adapted for that, rather than for the larger food possibilities and larger perils of a farming section.

### Numbers

Bachman says that one quarter only of the Foxes taken in New York State in his time were Gray-foxes.[8] That, however, is near the north limit of the species.

In Pennsylvania, according to the Report of the Game Commission, bounties were paid on 29,873 Gray-foxes killed in the State between April 15, 1915, and Dec. 31, 1922; whereas only 24,922 Red-foxes were reported during that time.[9] In Ventura County, Calif., Dickey found recently a "superabundance of Gray-foxes."

### Voice

The voice of the Gray-fox is said to be much like that of his Red cousin, but coarser, and in some of its notes even like that of the Coyote. But it has been little observed, and my own opportunities to hear it have been small.

No one has written of its soft whisperings to its young, or of its love-song. No one, so far, has thought of these as possible or worth while. But they surely have such, and the new generation of naturalists with better light and kindlier outlook, will seek for and find them.

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[8] Q. N. A., I, p. 51.

[9] Seth E. Gordon: Bull. Am. Game Prot. Assn.

### Disposition

If we mix equal parts of Red-fox, Coon, and Bobcat, and season the combination with a strong dash of Cottontail Rabbit, we shall have the Gray-fox's disposition synthetically produced. He is shy, he is cunning, he is a desperate fighter when at bay, he loves the trees and yet rejoices in the briar brush, he can run for hours and is an adept at trick-trailing, but will hide in a burrow or up a tree; and the places he frequents are the places where any one of these animals also may be found.

As I read the classic pages of Audubon and Bachman, I note that they say the Gray-fox is "shy and cowardly."[10] Reference to a long list of natural histories reveals the fact that every animal treated in this book is by someone described as "shy and cowardly." The truth is, I take it, that no animal is such. All animals are brave, for I do not know of one—with the possible exception of the Opossum—that will not fight to the death when brought to bay, no matter how numerous or powerful his foes may be. What is there of cowardice in a helpless Gray-fox of 10 pounds weight running away from 20 large hounds each 60 pounds, backed by half-a-dozen hunters each 150 pounds weight, on half-a-dozen horses each 1,500 pounds weight, and armed too often with guns and pistols into the bargain? Discretion is the better part of valour; the valiant Gray-fox is discreet. But do you want to see a fair fight and make a just appraisal of courage? Select a 10-pound Dog and match him against a 10-pound Fox. Then you will have no cause to charge the Fox with cowardice. Indeed you will have to play special Providence if you would save your Dog from destruction. Yes, go a step farther. You—a 150-pound man, we will suppose—go into the arena alone and armed only with nature's weapons, and grapple with a 10-pound Gray-fox—if you dare; and see which of you will come out free of the taint of cowardice.

Men there be, indeed, who lie down and give up when certain death is closing in on them. But the Gray-fox, according to the hunter, J. C. Bruce, when caught in a trap, never is cowed, never gives up, in spite of his helplessness, "but will growl, snap, and bark from the time he sees you till he is dispatched."[11] A brave man loves a brave foe, they say. Our reaction to the dauntless fortitude of the brave Gray-fox then sheds a shameful light, a dastard colour on our own kind, if we believe the evidence given in the last chapter of this record.

Some day I shall write a history of man as seen by the animals. They

[10] Q. N. A., I, p. 164.

[11] Cal. F. & G., July, 1921, p. 182.

may justly say: He is the most stupid and cowardly of all creatures. Although equipped with powers that are overwhelming, and with every advantage of size and assistance, he never is known to accept an equal fight, and at the slightest suggestion of danger, will fly back screaming with terror to hide in his den. Indeed, it is an axiom among us animals that the smallest of us need not fear the biggest of them, unless he be backed and protected by huge Dogs—renegades from our side—and has us hopelessly overmatched and outnumbered."

The Gray-fox is less swift, less strong, and less cunning than his cousin, the Red-fox. The one is a bandit, the other a burglar. But both know that they play a desperate game. They carry their lives in their teeth, and neither give nor expect quarter when the final show-down comes.

Every scrap of evidence goes to show that, whatever we think of the Gray-fox as an economic problem, as a menace to our material agricultural interests, he is at least endowed with the attributes that an impartial judge would say "make a hero."

## Marriage Customs

And what is the home-life of our hero? We should like to find it ideal, and, even if it were utterly regrettable, we should have to make excuses and allowances, as we do for weak-moralled human heroes. So far as known, the Gray-fox is a model husband and father; that is the tradition of his family; Wolves and Foxes are most exemplary. Alas, we have been so busy hounding the Gray-fox to his death, that we have never paused to ask what are his answers to the great questions of sex and duty that still torment ourselves.

Among all the masses of written stuff in which the Gray-fox is flayed dead and alive, physically and metaphorically, I can find only three brief paragraphs that shed light—pleasing light—on this little bandit of the black woods, and his life at home. The first is from the pen of good old John Bachman, who says: "On a cold starlight night in winter, we have frequently heard the hoarse querulous bark of this species; sometimes two of them some distance apart were answering each other in the manner of the Dog."[12] Why chiefly on cold winter nights? I do not know, except that analogy of the Red-fox and evidence furnished by Donald R. Dickey show that this is the love time.

The second is by Harry H. Dunn. He was Coyote-hunting in Death Valley, Calif., with a half-breed, Bob Lee, who was an expert at "calling." They had called two Coyotes and killed them with bow-and-arrow, when

[12] Q. N. A., I, p. 166.

it occurred to the hunters to try the trick on the Gray-fox which is common there.

"Just before we went home, the half-breed changed his call, and out of the hills came, not one, but three answers, all short, sharp barks. The weird dialogue continued for a few minutes, and then out of the darker shadows across the wash came two little Gray-foxes. Both stood in plain sight, possibly 25 yards away.

"'Shoot! Quick!' said Bob. I raised the rifle just as one of the Foxes wheeled, and at the crack the vixen pitched forward. Before I could shoot again, her mate disappeared.

"I remarked on the fact of the pair travelling, and apparently hunting, together, and Bob said it was common occurrence in his hunting experience to find them so in all seasons of the year, except when the young were in the 'form.'"[13]

Another glimpse of the partner life of the Gray-fox and his bride is maybe furnished by the following note from my Journal:

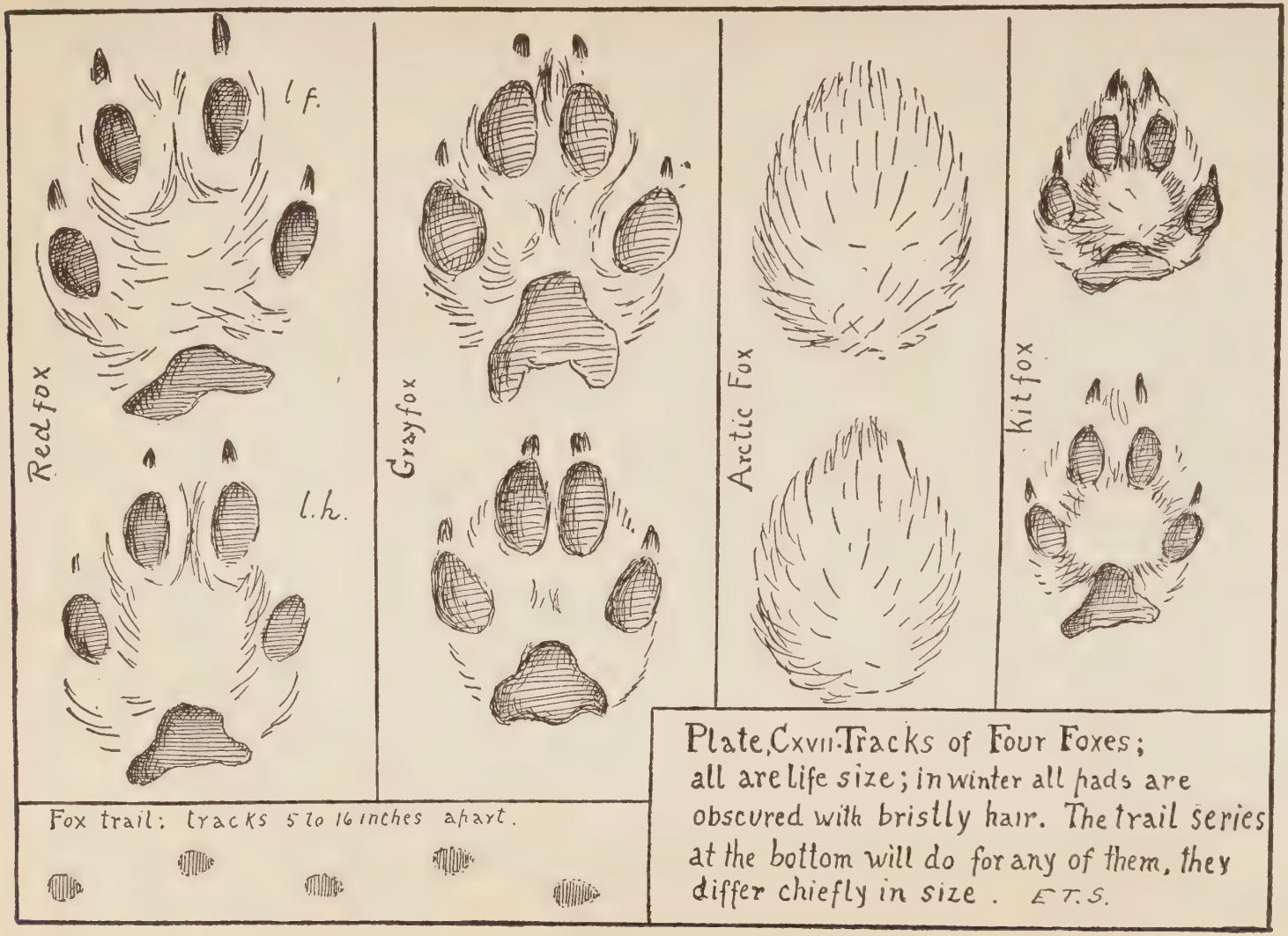
While staying at Kinney's Ranch, Tucson, Ariz., Jan. 23, 1923, I noted a remarkable incident that looked like a clever stratagem on the part of the Gray-fox. About 6 A.M., gray dawn, *something* led all the Dogs away to a distance on the north side of the ranch. Then around the chicken-yard on the south side arose the unmistakable harsh squall of a Gray-fox, going round and around the chicken-yard for a minute or more. I suppose that one of the pair led off the Dogs, while the other was to raid the hen-yard, but the tall fence frustrated the plan. Why should the Fox squall there so long and so loud?

The last, in a letter from my friend, Donald R. Dickey, gives something more than a hint of ideal family life. He says:

"My own experience tends to convince me that the pair stays together at least until the cubs are well grown, for I am myself satisfied that a series of a dozen or more photographs taken at one den portrays 2 adults. There were at least 3 cubs in this litter (subspecies *californicus*—3 cubs in one photo.)"

Young naturalists of the new epoch, will you not keep these things in mind and look for them? The fact that this freebooter of the tall timber is a true and loving husband and father, with a home-life and social pleasures, and a song expression of his own; and every scrap of evidence that you can gather to prove these things is fine gold—is a new fragment of the priceless mosaic that every field-man is striving to piece together—a mosaic that is the dream of every wise one, more beautiful and amazing than any of our fanciful dreams of it can be, for it will be the truth.

[13] Forest & Stream, Aug. 3, 1907, p. 172.




Plate, Cxvii. Tracks of Four Foxes; all are life size; in winter all pads are obscured with bristly hair. The trail series at the bottom will do for any of them, they differ chiefly in size. E.T.S.

In January, the Snow Moon, the Gray-fox wins his bride. Yea, though they have been mated for years, she must then be won over again.

For about 3 months, according to Bachman, the female hides her secret;[14] the analogy of the Red kinsman, however, would make it much less, more nearly 50 or 60 days. And then, absolutely obedient to the All-mother's whispered word, she selects a nursery for the coming brood.

## The Den

Not in a burrow underground, as with the Red-fox, is the nest prepared. A hollow log, or a hollow tree, is the favourite home den of the woodland mother Fox. Once, however, Bachman discovered it under the roots of a tree.[15] In the West, it chiefly dens in holes under rock piles.

"The two whelping dens I located in the West," says Dickey, "have both been under piles of large, loose rocks. One of them had three exits. In northern California, a refuge den found in the winter, by running an animal into it, was a hole in the ground under a large fallen tree, but may have originally been excavated by some other animal."

Although in general the Gray-fox neither digs nor uses a burrow, Bachman records one instance to the contrary. On a high, sandy pine-ridge west of Albany, N. Y., he found a "burrow from which a female Gray-fox and 4 young were taken. It differed widely from the burrows of the Red-fox, having only a single entrance. At about 8 feet from the mouth of the burrow there was an excavation containing a nest composed of leaves"; in this they found the young.[16]

## Young and Age

Here during mid-March in Dixieland, and mid-April in Yankeeland, the mother Gray-fox drinks the double goblet of motherhood—the joy of their coming, the fear for their safety.

Three to five young there are in the litter, and so far as we know, the father hangs about the neighbourhood, leaving little offerings at the door; but he takes no part in hovering or feeding the young until at length they begin to eat solid food, when about 6 weeks old.

Then he is permitted to become again a member of the family and provide maybe half of the food that is needed. In August or September the young are weaned, and very soon now the family bond is broken. The cubs

[14] Q. N. A., I, p. 171.

[15] As above, p. 167.

[16] As above.

go off alone to seek their fortune, and father and mother resume their roving life in partnership.

The young are quite independent of the mother now, and it is believed, but not made sure, that in December, though but 9 months old, they take each a mate unto himself.

"It is said they continue to grow for 18 months, and will live in freedom 14 or 15 years, but pine away and die in a much shorter period if in a state of confinement."[17]

### Winter Dens

The Gray-fox seems to differ wholly from the Red-fox in his habit of establishing a series of winter dens. The Red-fox, I think, never goes into a den except when it is used as a nursery for the young or as a refuge in extremity. Even in zero weather the Red-fox sleeps out. But the Gray-fox seems to have a definite system of holes that are his hunting lodges, his bad-weather homes in various parts of his range, all through the winter, and which also serve as final refuges in case the hounds are over-near.

Natural caves and rocky fissures are most often selected, but there is evidence that Grayback sometimes digs them for himself in sandy or clayey soil. In the wild and rocky woods on the Jersey side of the Hudson River are numbers of these rocky refuges, which serve either as permanent dwelling places or safe resorts in case of hard pursuit. "In this neighbourhood," says Bachman (p. 168), "they are most easily killed by finding the paths to their hole, and after starting the animal, making the best of your way to near the entrance of it, while he doubles about a little before the Dogs; you can thus generally secure a shot at him as he approaches his home, which if the Dogs are near he will do without looking to see if he be watched." Yes, this has often been done. But in other walks of life it is called assassination.

"In the State of New York," continues this genial old sporting naturalist, "we were shown a hollow tree leaning on another at an angle of about 45 degrees, from a large hole in which 2 Gray-foxes had been taken; they were traced to this retreat by their footsteps in the deep snow, and from the appearance of the nest, it seemed to have been their resort for a long time."[18]

### His Answer to the Dogs

In most rustic minds, the word "Fox" conjures up at once its kin word "hunting." When pursued by the hounds, the Gray-fox, like the Red, may strive to tire them out by a long run, or throw them off the scent, or finally

[17] Doughty's Cabinet of Natural History, 1890, II, p. 145.

[18] Q. N. A., I, p. 167.

hide in a hole underground. But he has a much better trick than the last. There is a well-known ancient fable that a Fox and a Cat were swopping notes on their problems, and especially on how to baffle the hounds. The Fox said, "Pooh! I never fear the hounds. I have a bag full of tricks to play whenever I hear them after me." The Cat looked his admiration but said, "Alas, I have only one trick and that is to climb a tree, but I have always found it quite satisfactory." The Fox replied that he never tried that and didn't need it. Eventually, however, he lost his life for lack of it.

That fable might apply in Europe, but not here, for our Gray-fox climbs a tree almost as well as a Cat.

### Climbing

Bachman says: "Although we have often seen this Fox fairly run down and killed by hounds, without his having attempted to climb a tree, yet it not unfrequently occurs that when his strength begins to fail, he ascends one that is small or sloping, and standing on some horizontal branch 20 or 30 feet from the ground, looks down on the fierce and clamorous pack which soon comes up and surrounds the foot of the tree.

"We were on one occasion, in company with a friend, seeking for partridges in an old field partially overgrown with high grass and bushes, when his large and active pointer Dog suddenly started a Gray-fox, which instantly took to its heels, pursued by the Dog; after a race of a minute, the latter was so close upon the Fox that it ascended a small tree, and our friend soon came up and shot it. We were unable to obtain any information in regard to the manner in which the Fox climbs trees, as he does not possess the retractile nails of the Cat, or the sharp claws of the Squirrel, until we saw the animal in the act. At one time when we thus observed the Fox, he first leaped on to a low branch, 4 or 5 feet from the ground, from whence he made his way upward by leaping cautiously and rather awkwardly from branch to branch, till he attained a secure position in the largest fork of the tree, where he stopped.

"On another occasion, he ascended in the manner of the Bear, but with far greater celerity, by clasping the stem of a small pine. We have since been informed that the Fox also climbs trees occasionally by the aid of his claws, in the manner of a Raccoon or a Cat. During the winter only about one fifth of the Foxes chased by hounds will take a tree before they suffer themselves to be run down; but in summer, either from the warmth of the weather causing them to be soon fatigued, or from the greater number being young animals, they seldom continue on foot beyond 30 or 40 minutes before they fly for protection to a tree. It may here be observed that as long

as the Fox can wind through the thick underbrush, he will seldom resort to a tree—a retreat to which he is forced by open woods and a hard chase."[19]

"In climbing," says Rhoads, "it shows a strange affinity to the Cats, not only leaping from limb to limb in pursuit of prey, but ascending quite tall and limbless trunks, by a regular clawing and hugging process, literally 'shinning it'!"[20]

Later, this naturalist says that Seth Nelson, Jr., the son of a well-known woodsman, "told me he had seen one ascend after a Squirrel to the height of 60 feet, on an erect dead pine stripped of its bark. It did this voluntarily, literally 'shinning' 25 feet up the branchless trunk and backing down again, as a boy would do it. He has known his Dogs to run them up an erect tree 18 inches in diameter, the first limb of which was 20 feet from the ground."[21]

"They have been surprised in the top of a tree, curled up in the abandoned nest of a hawk."[22]

In Texas the same habit is recorded.

"These Foxes go up the trunk of a tree with almost cat-like ease," says Bailey. "I have found them looking down at the Dogs from 20 to 40 feet up in the brances of nut-pines and live-oaks, and have known of their climbing a yellow pine (*Pinus ponderosa*) where 20 feet of straight trunk over a foot in diameter intervened between the ground and the first branch. More often they take to a live-oak or juniper, where the lower branches can be reached at a bound, and then, squirrel-like, hide in the swaying topmost branches. On the approach of the hunter, they become anxious and seem to doubt the security of their position, sometimes making a flying leap to the ground. Stones and clubs will usually dislodge them from the treetop.[23]

Even in the Far West, where the greatest variation from the type is seen, the Gray-fox is the Tree-fox.

Robert P. Lincoln writes: "The Foxes (of California) are either trapped or run at night with a swift Dog, as a swift Dog will tree them the same as a Coon, but they will leave a slow Dog and lose him in the rocks, streams, and steep mountains. The idea of treeing a Fox will be laughed at, but our Gray-foxes tree readily enough here, and the same is true through the South. Though not so good at climbing as a Coon, I have shot them 40 feet from the ground on an almost perpendicular tree."[24]

[19] Q. N. A., I, p. 166–67.

[20] Mamm. Penn. & N. J., pp. 143–44.

[21] Mamm. Cent. Penn., p. 220.

[22] Mamm. Penn. & N. J., p. 144.

[23] Texas, p. 181.

[24] Forest & Stream, Dec. 19, 1914, p. 787.

PLATE CXVIII—GRAY-FOXES IN PHILADELPHIA ZOO
Photographs by E. T. Seton, February 7, 1924
In No. 2, they were quarrelling

## Food

There is not the least doubt that the Gray-fox is as omnivorous as anything alive. He will eat almost everything that any animal will eat, but his preference is for flesh. Here are some of the staples of his bill of fare: Fawns, young Woodchucks, Possums, Rabbits, Skunks, young Pigs, young lambs, Muskrats, Porcupines, Weasels, Squirrels of any kind, tree or ground, Rats, Mice, Moles, all kinds of birds it can catch, including poultry, all kinds of eggs that it can find, including those of turtles and snakes, young turtles, snakes, lizards, frogs, fish, shrimps, clams, oysters, crayfish, grasshoppers, maggots, fruits, berries, corn, nuts, acorns, and mushrooms.

An ancient Japanese philosopher it was who said, "Show me what he eats and I'll tell you what he is." This same leader of celestial thought might have been profoundly puzzled had he been called on to analyze the mind of the Gray-fox on the strength of his diet as herein set forth.

In Texas, during "June, they were feeding extensively on berries of *Zizyphus obtusifolia* and *Adelia angustifolia* along the Rio Grande near Boquillas, while around the Davis Mountains in early August they were feeding mainly on the ripe fruit of *Opuntia engelmanni*. In December in the Davis Mountains and in September in the Guadalupe Mountains they were eating the sweet pulpy berries of *Juniperus pachyphlœa*, which grow in great abundance in these ranges and in the Chisos Mountains. Mice, Wood Rats, Ground-squirrels, Rabbits, and various other small rodents are eaten when obtainable, and, much to our annoyance, are often taken from our traps or carried away, trap and all. At Langtry, Gaut examined several stomachs, and in one found part of a mocking-bird and in another a *Perognathus*. At most of the ranches there are enough Dogs to keep the Foxes at a respectful distance from the poultry; but they have a keen relish for chickens, and are often complained of in vigorous terms. Without data for positive statements it seems probable that the good done in destroying small rodents equals, if it does not exceed, the mischief done among poultry."[25]

Note, however, that all of these foods are the produce of the forest. Even the Pigs and poultry must stray into the woods before they are in danger.

Bachman supplies this enlightening note showing that a new condition has developed a new habit.

[25] Texas, p. 181.

"A farmer of the State of New York called our attention to a field of corn (maize), which had sustained no inconsiderable injury from some unknown animals that had been feeding on the unripe ears. The tracks on the field convinced us that the depredation had been committed by Foxes, which was found to be the case, and they were afterward chased several successive mornings, and 3 of them, apparently a brood of the previous spring, were captured."[26]

Good old Bachman, though he made the unwarranted slip of calling the Gray-fox "a coward," has not failed to do justice to the huntercraft of the creature, for whom indeed he had evidently a sort of sneaking affection.

He says, "We have never, indeed, heard any well-authenticated account of the species having entered the poultry-yard of the farmer; it is true, it will seize on a goose, or a turkey hen, that happens to stray into the woods or fields and make its nest at some distance from the house; but we have not heard of its having attempted to kill Pigs, or like the Red-fox, visited the Sheep pasture in spring, and laid a contribution, from day to day, on the young lambs of the flock."[27]

In the mountains of Ventura County, Calif., where Dickey found a "superabundance" of Gray-foxes, "they seemed," he says, "to be feeding exclusively on manzanita berries. Here in the West, my own temptation is to minimize the actual damage done to poultry. The den that I studied longest was within 200 yards of a chicken run, and the birds used to wander through the brush patch where the den was located, except at night when they were penned up; yet only one chicken was brought to the den in all the time I watched it, and that was an old black hen that had been *long* dead when it was lugged to the den. In the Colorado River Valley, in the late spring (May 17th, to be exact), I observed one instance of a Gray-fox that had been evidently hunting through the low willow bottoms during the night, and was carrying back, presumably to its young, two small Rabbits (*Sylvilagus audubonii arizonæ*) and one juvenal Abert towhee (*Pipilo aberti*)."[28]

Rhoads, after a full investigation of the species in Pennsylvania, felt compelled to write:[29]

"The food of both species of Eastern Fox forms an important consideration in their relations to man. The concurrent opinion of nine tenths of the farmers and sportsmen of Pennsylvania who contributed to Dr. H. B. Warren's economic report on these animals, heartily condemns both species as

[26] Q. N. A., I, p. 166.

[27] As above, I, p. 164.

[28] Letter, Oct. 4, 1923.

[29] Mamm. Penn. & N. J., p. 144.

vermin in the worst sense With this opinion I fully concur. The only argument brought up in their favour is their destruction of Mice, Moles, and insects. As I have previously pointed out in treating the *Muridæ*, and as I shall explain later in regard to the *Insectivora*, the destruction of Mice and Moles is not necessarily a benefit to man, the majority of the former not being proved to be noxious, especially the woodland species which Foxes principally devour. Owing to its subterranean habits, the Pine-mouse, a truly noxious rodent, is rarely captured, the Wood-vole (*Evotomys*), Meadow vole (*Microtus*), and Deermouse (*Peromyscus*) being the species forming the bulk of their Mouse diet. Their destruction of insects, especially grasshoppers, is no doubt beneficial, but seems to be only fortuitous, one turkey or chicken probably eating as many of these in a day as all the Foxes of a square mile in the same length of time. When the Fox comes along, as he is ever doing, and eats the turkey, methinks his value as an insect-destroyer suddenly vanishes."

Such opinions have weight, of course, but are far from conclusive. They are merely opinions, founded partly on evidence and partly on prejudice. And they ignore altogether the æsthetic value of the Gray-fox, and the need for maintaining the balance of nature as we found it. For my part, I would suffer much damage before I would plot to rid our woods of this delightful little rascal. And if our friends who feel not so will fairly appraise the annual damage by Dogs, and then tell me that in fairness and logic, all Dogs should be destroyed, they will at least be facing facts, and realize that sentiment is the biggest fact of them all.

Thus, O brave little Gray-fox, you are on trial—not for your life, but for your reputation, which in this case amounts to nearly the same thing, and I, being self-appointed judge and wholly prejudiced in your favour, do pronounce you "not guilty." Go! You are as free and as blameless as ever you were, and when you need a friend, you seek me out.

Though this case be closed, I would refer again to Bachman, who seems to have known the Gray-fox better than any writer since, and in quoting the damning evidence of Mane-tail's destructiveness, it is pleasant indeed to note the old naturalist's undertone of delight at the success of the grizzly-coated rogue.

"That this Fox occasionally gives chase to the Gray-rabbit, pursuing him in the manner of the Dog, we have strong reason to suspect. We on one occasion observed a half-grown Rabbit dashing by us with great rapidity and running as if under the influence of fear; an instant afterward a Fox followed, seeming to keep the object of his pursuit fairly in sight; scarcely had they entered the woods, when we heard the repeated cry of the Rabbit,

resembling somewhat the cry of a young child in pain, and although we were not eyewitnesses of his having captured it by sheer speed, we have no doubt of the fact. We do not believe, however, that the Fox is an enemy half as much to be dreaded by the family of Hares as either the Bay-lynx or the great horned owl (*Strix Virginianus*).

"In the Southern States, this species is able to supply itself with a great variety and abundance of food, and is consequently generally in good condition and often quite fat. We have followed the track of the Gray-fox in moist ground until it led us to the scattered remains of a Marsh-hare, which no doubt the Fox had killed; many nests of the fresh-water marsh hen (*Rallus elegans*) are torn to pieces and the eggs devoured by this prowler. In Pennsylvania and New Jersey, the Meadow-mouse (*Arvicola Pennsylvanica*) is often eaten by this species, and in the Southern States, the Cotton-rat and Florida Rat constitute no inconsiderable portion of its food. We have seen places where the Gray-fox had been scratching the decayed logs and the bark of trees in order to obtain insects."[30]

"The wild turkey hen often makes an excavation in which she deposits her eggs, at a considerable distance from the low grounds, or makes her nest on some elevated ridge, or under a pile of fallen logs covered over with scrub oaks, ferns, tall weeds and grasses; we have often seen traces of a violent struggle at such places; bunches of feathers scattered about, and broken egg-shells giving sufficient evidence that the Fox has been there, and that there will be one brood of wild turkeys less that season. Coveys of partridges, which generally at the dusk of the evening fly into some sheltered place and hide in the tall grass, arrange themselves for the night in a circle, with their tails touching each other and their heads turned outward; the Gray-fox, possessing a considerable power of scent, winds them like a pointer Dog, and often discovers where they are thus snugly nestled, and pounces on them, invariably carrying off at least one of the covey.

"On a cold, drizzly, sleety, rainy day, while travelling in Carolina, we observed a Gray-fox in a field of broom-grass, coursing against the wind, and hunting in the manner of the pointer Dog. We stopped to witness his manœuvres; suddenly he stood still, and squatted low on his haunches; a moment after, he proceeded on once more, but with slow and cautious steps; at times his nose was raised high in the air, moving about from side to side. At length he seemed to be sure of his game, and went straight forward, although very slowly, at times crawling on the earth; he was occasionally hidden by the grass, so that we could not see him very distinctly; however, at length we observed him make a dead halt. There was no twisting or

[30] Q. N. A., I, p. 166.

PLATE CXIX.—GRAY-FOXES

Photographs taken in Southern California by Donald R. Dickey

No. 1.—Den of Gray-fox (*californicus*), Ojai Valley, Ventura Co.
Nos. 2 & 3.—Flashlights of the same, Topa Topa Mt., Ventura Co.
No. 4.—Flashlight of *scotti*, near Laguna Dam, Imperial Co.

horizontal movement of the tail, like that made by the common House-cat when ready to make a spring, but his tail seemed resting on the side, whilst his ears were drawn back and his head raised only a few inches from the earth; he remained in this attitude nearly half a minute, and then made a sudden pounce upon his prey; at the same instant the whirring of the distracted covey was heard, as the affrighted birds took wing; two or three sharp screams succeeded, and the successful prowler immediately passed out of the field with an unfortunate partridge in his mouth, evidently with the intention of seeking a more retired spot to make a dainty meal.

"We had a gun with us, and he passed within long gun-shot of us. But why wound or destroy him? He has enabled us for the first time to bear witness that he is not only a Dog, but a good pointer in the bargain; he has obeyed an impulse of nature, and obtained a meal in the manner in which it was intended by the wise Creator that he should be supplied. He seized only a single bird, whilst man, who would wreak his vengeance on this poacher among the game, is not satisfied until he has killed half the covey with the murderous gun, or caught the whole brood in a trap, and wrung off their necks in triumph."[31]

### Storage

So far as noted, the Gray-fox has not the habit of storing food for hard times ahead. This may mean that the southland which he inhabits has so little of snow and so much of game, that he is sure of a living the year round, or it may mean that we have been too busy hounding and killing him to notice his pleasant little ways.

### Habits in General

Although the Gray-fox is chiefly nocturnal in his habits, Bachman "frequently observed him in search of food at all hours of the day; in general, however, he lies concealed in some thicket, or in a large tuft of tall broom-grass, till twilight invites him to renew his travels and adventures."[32]

"The Gray-fox is frequently caught in steel-traps, and seems to possess far less cunning than the Red species; we have never, however, seen it taken in box-traps, into which the Bay-lynx readily enters; and it is not often caught in dead-falls, which are very successful in capturing the Raccoon and Opossum.

"The Gray-fox does not possess the rank smell of the Red-fox or the European Fox; as a pet, however, we have not found him particularly in-

[31] Q. N. A., I, pp. 164–65.

[32] As above, I, p. 166.

teresting. It is difficult to subdue the snappish disposition of this species, and we have never seen one that was more than half tamed. It does not at any time become as playful as the Red-fox, and continually attempts to escape."[33]

His wild-wood cunning does not leave him in captivity, as the following incident shows. It was sent me by Geo. G. Byram of Succasunna, N. J.

"A Gray-fox and her 3 kits were kept chained in a farmyard here. After several months the poultry seemed to be disappearing, and a watch was kept and the circumstance explained. The Foxes would push their food away from their boxes so far that the chickens thought themselves out of danger, but when they were eating, a Fox would pounce on one and make a meal of it."

### Diseases

As to the diseases and private troubles of the little Gray-fox, we have no information, and if he has special medicaments, such as herbs, tonics, salt-licks, or watering places, they have hitherto escaped observation.

Indeed, we have been so wholly intent on killing him that we know almost nothing of Gray-coat's mind when it is concerned with the other chapters of his life.

### When Our Brave Ones Go Forth to Kill Him

We can get up quite a respectable surge of human emotion over the story of Eliza's dash across the ice to escape one or two bloodhounds and some human brutes who were planning to send her back to the home and condition that she preferred to abandon. Very good! Can we not conjure up some warmth and sympathetic thrill over the efforts to escape made by our valiant little Gray-coat when pursued by half a hundred hounds and a score of mounted riders absolutely bent on tearing him to pieces?

And what does he do when the hideous yelling, trampling, and roaring notify him that a host of strong foes have resolved on his death? Does he surrender? Throw himself on the mercy of the merciless? Not he! He is schooled in a school of valour. He has not the speed, the strength, or the cunning of his cousin, the Red-head, but he has a few tricks.

His first dash is for some thickly grown and tangled retreat, preferably a labyrinth of rocks and windfalls, or if in a dry country, the shelter and concealment of a heavy growth of young pines along some elevated sandy ridge where they grow to hedge-like closeness; having gained this, he threads the low down-trails and dashes through the densest thickets, where Dogs

[33] Q. N. A., I, p. 168.

can hardly follow him. He does not, like the Red-fox, run far ahead of the pack, but generally courses along from 70 to 100 yards in advance of his pursuers, continually doubling when in favourable ground, so that when the hunter is on foot, even, he can occasionally obtain a "view," and can hear the cry of the pack all the while.

In twenty minutes, usually, he has proved or disproved the value of that thicket. His pursuers are hot and close behind him. But he knows of other labyrinths even better perhaps than this, and now he plays a trick that is beyond the power of his Red cousins. He shins up the biggest tree he can get near! Up, up to its longest limb; along that he runs to its farthest branch, then leaps to the ground and away.

This makes a break in the scent that will keep the hounds some minutes in working out. Some minutes may mean a mile.

Meanwhile, he is speeding far away, and if so be that a snake fence crosses his path, he mounts the top rail and runs it like a Cat, for it is a good scent-breaker.

Thus he plans many delays for his following foes, and if the next haven be not too far, he makes it, and resumes his baffling tactics of winding, cat-climbing, zigzagging, back-tracking, and dashing away.

If seen in the open on a straight-away, the hounds may catch him in 200 or 300 yards; rarely indeed can the Gray-fox hold out for more than two hours in an open run. But an open run is not his game, and if the fates be not set on his destruction, he can usually reach another labyrinth and play his own cute strategy. If, at last, he is tiring out, and must in some sort say "good-bye," his ancient and long-time most effective trick is to climb some tree, and curled in a high fork or even in the nest of a crow or a hawk, make silent mockery of his baffled yelling foes below.

An old darkey who was eyewitness of just such a ruse, described it thus: "Dat Fox, she oughter be let lib', I declar'! I neber seed such a trick as dat!" he cried.

. . . . . .

"Dat ar Fox cum' cross dat field more'n a mile afore dem Dogs an' went ober dis yere fence right dar. He run down dar in de woods an' walked on dem logs an' on dat stump an' on to de tops ob dat tree what's out down dar. Den he cum back in de same track an' jumped up on dis fence right whar he went ober de fust time; he walked on de top rails tell he cum to dat big nest, den jumped right up into it. He is a-laying dar yit, jes' as scrumptious as you please!"[34]

This was a good trick when his people first learned it and taught it to

[34] W. A. Bruce: Recreation, Sept., 1901, p. 193.

their young. It was a perfect answer to pursuit by Wolves. But now the added peril of the huntsman is to be reckoned with—man, that can climb, or worse, can kill without climbing. The fugitive is commonly spied out in his high perch, compelled to leap—and tired and footsore runs again till the inevitable finish.

But even this is not heavy enough odds to cast against him. The unfairness and cruelty of the hunters (sportsmen!) is such that a common practice, according to Bailey, is to spy him out in his high perch, then have some rifleman break his leg with a shot, so that the brave Fox who leaps to dash again for life is a cripple, hopelessly overmatched. After a little run he is inevitably overtaken and torn to pieces by the fearless and valiant mob.[35]

There is, however, one Fox sanctuary—grim—invulnerable—inexorable—that never gives up its fugitive—that is, a den in the rocks. In all rocky country the Gray-fox aims to have at least one final refuge in the ledges, and once in that, he can mock at hunters, hounds, and guns. Like the Coney, the Goat, and the Woodchuck, his refuge, his hiding place and his salvation, is in the rocks. Maybe it is for this reason that his kind is increasing in New England. Nevertheless, he is also holding his own in other places, for his pelt is of little value; it costs large money to keep up a pack of hounds; he is learning new tricks as new tricks are brought against him, and in Dixieland, Texas, and California he is still abundant and likely to be. Long may he live and prosper.

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[35] Texas, p. 181.

## SONG OF THE HUNTED

By Dr. Frederick Brush, of New York

(*By permission*)

Awake, awake, and the sun-kiss take!
Open the cave-dulled eye,
Sport freely in the open,
Let out the wild woods cry.
He came to snare,
He came to kill,
He of the iron arm and will;
But under the cliff he lieth still,
And no one saw him die.

Leap! breast and cleave the frosty air!
Beat the blue lakes to foam.
Tell all the young in nest and lair
The highland yet is home.
He came to kill,
He came to snare,
But the Gray-fox found him lying there,
And all dark red was his matted hair—
Roam, ye of the forest, roam.

Then awake, awake, and the sun-kiss take!
We have turned the evil thing.
No beast shall drag the red leg home,
No bird the broken wing.
He came to maim,
He came to kill,
He of the iron arm and will;
But under the cliff he lieth still,
And no one saw him die.

# FOX-FARMING FOR FUR

By E. T. Seton, published in "Country Life in America," Jan., 1906

The rapid disappearance of certain wild fur-bearers, combined with the steady demand and ever-rising prices commanded by good furs, has led many to look for means of artificially supplying the want.

It is years since the idea of breeding for fur was first discussed, but never were the times so ripe as now, and it is the object of this article to set forth the important branches of the new industry for the benefit of those who wish to embark in it.

This kind of farming offers two distinct fields. First: the production of a new variety of some already domesticated and easily multiplied animal —as Cat, Dog, Goat, Rabbit, or cow—with a coat of such quality as to have a new value as fur.

The second: the breeding, under protection, of certain wild animals whose fur has already an established market value. In this class are Beaver, Mink, Otter, Skunk, Marten, Fisher, and Fox.

In other words, one makes a fur-bearer of an animal already domestic; the other makes domestic an animal already a fur-bearer.

The second is the only department that will be treated herein. There are two ways of dealing with this; we may call them the wholesale and the retail.

The first is the instinctive choice of the beginner. He usually plans to get possession of an island, a mountain valley, or at least a couple of hundred acres of wild land with a high fence around it. This he expects to stock with fur-bearers that will increase speedily to thousands, after which he has nothing to do but shovel in a few tons of offal weekly and draw off a few thousand of the choicest pelts yearly. This is what I call the wholesale method. It has never yet succeeded with Red-foxes, nor indeed with any creature that I know of, except, perhaps, to some extent, the Blue-fox on the islands of Alaska.

Success in breeding any domestic animal turns on personal care that can be directed and adapted to each individual, if need be; which is, obliquely, a reason why the would-be fur-farmer is better off with five acres than with five hundred. This individual method is what I call the retail plan; it has been proved a success many times.

Fur-farming is a good chance for small capital. A man of experience may put in $1,000 and get a remarkable percentage as soon as well started. But any one who thinks he can put in $10,000 or $20,000 and do the same with little experience and labour is certainly going to end in disaster.

There is no object in breeding cheap furs. A Muskrat with its fifteen-cent pelt is almost as much trouble to raise as a $300 Silver Fox; therefore, only the high-class fur should be considered.

What is the most valuable fur of all? No doubt the Sea-otter. But the animal is so rare that a large fortune would be exhausted in getting the stock, and nothing is known of the method necessary to its propagation.

Next on the list is the Silver Fox. The Black or Silver Fox is nothing but a black phase or freak of the common Fox, just as the black Sheep is a colour freak of the common Sheep. A pair of pure Red-foxes may have a black Fox in their litter, and that black Fox may grow up to be the parent of nothing but Red-foxes, but a Red-fox will bring only a dollar or two, and the Silver Fox a hundred times as much.

The thoughts of the fur-farmer, then, are likely to turn at once to the Silver Fox. The first objection usually made to it is its sterility in captivity. At one time, indeed, it was said that the Fox never breeds in confinement. This, however, is far from the truth. Experience proves that the Fox is as fertile in captivity as any other carnivore when properly managed. Another popular error that is widespread, even in books of good repute, is the idea that a Fox cannot be tamed. It is highly probable that some individuals will always continue wild and treacherous in captivity, but most of them respond to judicious treatment, and some of them, as I have seen, become as tame as House-cats.

The original pioneer of Fox-ranching was Charles Dalton, a trapper and fur-trader of Tignish, Prince Edward Island. In 1887, he began to experiment with Red-foxes. About the same time, Robert Oulton got some Silver Foxes to try out on his fur ranch. They gradually solved the problems and made fox-ranching a success. Since then, it has had a great boom (1910) and now again settled down to a reasonable basis as a sound and recognized industry.

It is not my purpose here to give full instructions in ranching, but I repeat my own paper of 1906, which, so far as I know, was the earliest published information on the subject. Those who wish to go into it as a business will find a list of guides and books of information at the end of this chapter.

I first saw Foxes successfully managed by N. E. Skinner, of Bangor, Me. He began a fur-farm in Winnipeg in 1899. But the best working out of fox-

PLATE CXX.—A FUR FARMER AND ONE OF HIS BREEDERS

PLATE CXXI.—YOUNG AT MEAL TIME
Foxes on fur farm
From photographs by E. T. Seton

farming as a paying commercial enterprise that I have seen, is at Dover, Me., where I had the privilege of inspecting the farms of E. Norton and M. F. Stevens, in July, 1905.

Stevens's enclosures were 30 feet each way and surrounded by a mesh-wire fence 10 feet high with an 18 inch overhang at the top, and sunk 3 feet into the ground. Six feet would have been high enough, but at Dover they have to reckon on snowdrifts 4 feet high. The overhang is necessary, as the Foxes climb up the wires like Cats. It is quite a common thing to see one or more of them clinging to the cage at a height of 10 feet from the ground, and there they stay for minutes at a time trying to get out by forcing the wires.

The Norton yards at Dover are considerably larger than the Stevens, his smallest being 50 by 25 feet, and the large runs 230 by 64 feet. The fences are alike.

After inspecting these two farms, and hearing of the various problems to be met, I should thus plan a small fox-yard—and no wise man will go into a large one until after he has had enough experience to avoid the inevitable blunders that on a large scale would be fatal.

The whole space is 120 by 230 feet, a little over half an acre. All the fences should be 10 feet high, of $1\frac{1}{2}$ inch mesh, No. 16 galvanized wire, as a kit—that is, a weanling in his first summer—can go through a 3-inch mesh, and a full-grown Fox can squeeze out of a 4 by 4. The netting should go 3 feet below ground, or down to hard-pan, and would be still safer with a turn in of 18 inches at the bottom, although a line of flat stones laid with the fence, inside, is usually enough to prevent any digging out. At the top it should have an overhang of 18 inches. This is simply the ordinary mesh wire supported on crosspieces nailed to the posts.

The outer lane is 15 feet wide, that is, wide enough for a wagon, but it can be reduced to barrow width, if space is an object. In each of two corners is a kennel for a watch Dog that patrols the lane; for among the plagues of the fox-farmer are the sneak thief and the malicious neighbour, who might open the gate by night and thus cause the loss of all the stock. At each of the other corners is a long refuge box with a 5 by 9-inch hole at each end. In these any Fox getting out of his pen will take refuge from the Dog and remain till put back where he belongs.

The small cages are designed each for a breeding female. If more than 5 were on hand, these cages might be halved without serious cramping. All their doors are 2 by 4 feet, and open on the central alley. Their sill sides should be raised a foot to allow for snow.

In each, at its driest point, a hole about 3 feet wide and 2 feet deep

should be dug and roofed over with something to turn the rain. A 9-inch hole, angling down to this at one side, completes the den. In the Norton yards these dens were shingled, as it is very important to have the nursery well drained and dry. No lining is needed. The mother Fox can add it at will, or leave it out, as she mostly does.

The large cages are loose ranges for any or all that are not nursing mothers or very young. All open into the central lane, as an additional safeguard against escape. This lane is 4 feet wide. It is furnished with a

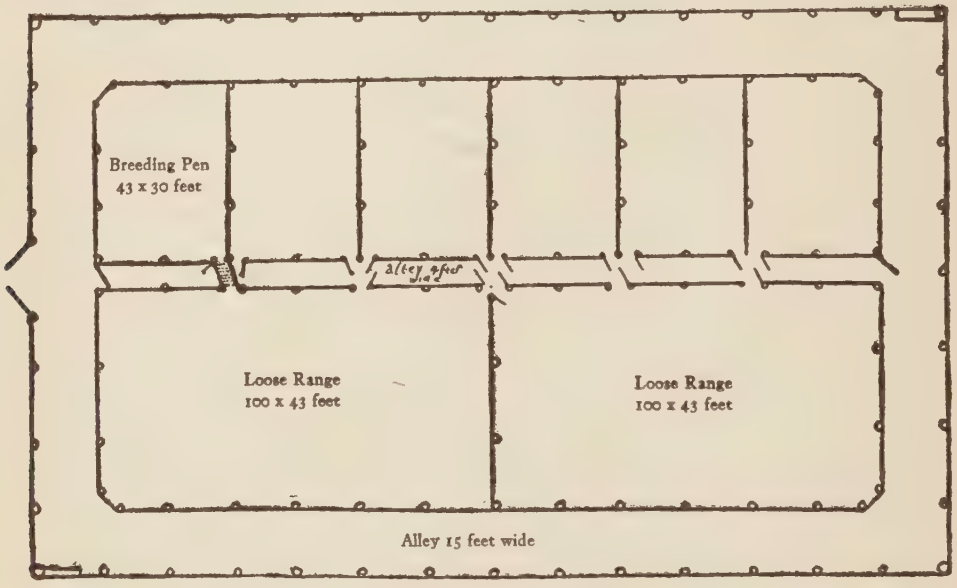



Diagram of model fox-yard

movable alley cage about 5½ feet long by 2 feet wide and 4 high; it is made on the bias and provided with a drop door at each end. Both top and bottom should be of light boards, as sometimes one is floor, sometimes the other. This is put across the lane from door to door when it is intended to change an animal from one cage to another. At left, in the diagram above, it is shown in position to allow of the Fox being driven from the pen. By this means a Fox can be transferred from any one pen to any other without handling.

## How to Feed Them

Most beginners will ask themselves—or other competent authority—what does the Fox feed on in a state of nature, and then decide that that is his proper food in captivity. Curiously, and happily, this decision is not backed by experience. Those who feed the Foxes on fat pullets, Rabbits,

and Mice will soon find their charges a lot of worm-eaten dyspeptics. A much better answer is given by Norton and endorsed by Stevens, "Feed your Foxes the same as your Dogs." Bread, table scraps, and a very little meat, is their diet on the farms. Norton feeds butcher's scraps, offal of animals, and in the winter he often gives them the flesh of a Horse, taking great care that it be not one that died of disease.

Stevens feeds his chiefly a cake made of the following recipe: One quart sour milk, 1½ teaspoons of soda, enough corn meal or "Daisy flour" to make it stiff, spread half an inch thick on pans, and bake. No sugar, salt, or eggs are needed. This will keep for two weeks, and is eagerly eaten by the Foxes. The young ones that I saw came running and shouldering like a lot of little pigs to get at it in the trough when the evening meal was announced by a familiar whistle. A piece 2 by 3 inches makes a meal, and they get two meals a day—morning and night. Each Fox also gets daily a pint of skim milk, and once a week about half a pound of raw meat. They are extremely partial to Woodchuck. One fat Woodchuck is enough to make a week's allowance for eight Foxes.

Norton occasionally shoots a crow and throws it in. The Foxes do not touch it for two or three days; then, as it gets gamy, they devour it with relish. Neither farmer has tried dog-biscuits. If a Fox secures more food than he can eat, he buries it till he is hungry, keeping a watch on the place lest any fellow captive should steal his hoard.

Stevens has been in the business for two years; he has 20 or 30 Foxes, and reports none lost at any time by disease.

Norton has had five years' experience; he carries 30 to 40 Foxes, and reports that one or two die each year from a disease that affects the head. It causes a running of the nose and fills the ears with scab. A careful comparison of their systems of diet shows that the Norton Foxes get more meat than the Stevens Foxes.

### Breeding in Pens

In a state of nature the Fox is a monogamous animal; is believed to pair for life. In captivity the breeders encourage polygamy, letting one very choice male serve several females. The embarrassingly high moral standard of the Fox is one of the difficulties of the breeder, but there is good reason to believe that human care and influence will undermine their awkward scruples exactly as with the Dog and other animals that have submitted to domestic life. I am told, on the other hand, that polyandry is bad. If a breeding female is allowed to join with two males in the same season, the result is said to be sterility. I do not know what this is grounded on.

Over-fat animals do not breed. It is a great mistake to over-feed. In this we probably find one reason for the infecundity of Foxes in most menageries. An ordinary Fox weighs 8 or 9 pounds. The largest and fattest Norton ever had was $16\frac{3}{4}$ pounds. The breeders should be kept down to about 10 pounds. Stevens claims that of those that mate in his yard half are fertile; Norton claims only one third. As also noted, Stevens feeds them less, but something may also be due to the fact that the Stevens farm is on a quiet hillside in the country, while the Norton farm is in the busy town of Dover.

The wild Foxes mate in late January or early February, the captives are four or five weeks later. When the time comes, the female utters her peculiar squeal and the male answers with a deeper, coarser bark. Both show a restlessness and a good deal of excitement.

The period of gestation is 51 days without 12 hours' variation; of this I am assured by both breeders.

The wild dog-Fox is a model father and faithfully helps to provide for the young, but in captivity he is not needed, and it is best to keep the mother in the breeding pen by herself. The quieter she is the better. The young should not be approached, much less handled. Strangers should be forbidden the range till the young are able to run. If disturbed or frightened the mother is liable to carry the young about in her mouth, seeking a safer place for them, till they are worried to death.

The young number from 3 to 9; 6 or 7 are the usual litter. They are born blind; their eyes open about the seventh or eighth day. When they are a month old they begin to come out and play together like kittens. They are now considered past the critical period. They begin to eat solid food, and, when three months old, the mother weans them, and they may be taken away. At midsummer they are half grown, by winter apparently full grown, and in the following February or March, while yet less than a year old, they also breed. The young are much wilder than the old ones at first, but good management soon convinces them that all their fears are ill-founded, and they soon get tame and gentle.

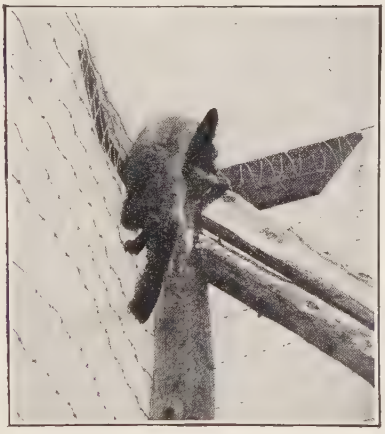
Foxes are much less quarrelsome than most carnivores. Norton has lost only 2 through fighting. Both were killed by an abnormally vicious old dog-Fox that bullied the others. Such instances are rare, and a Fox of that temper should be considered a freak and not allowed to breed.

Every effort should be made to "gentle" the Foxes. First, by selecting the most docile to breed from; second, by giving them no cause for alarm.

Cleanliness is of the utmost importance. Clean drinking water and clean pens are essential. The Foxes are naturally clean. They do not bury

TEN FEET FROM THE GROUND

FORCING A MESH



CLIMBING UPRIGHT WIRE

IN THE YARD

PLATE CXXII.—YOUNG FOXES ON FUR FARM
To illustrate especially the climbing propensities of the young
From photographs by E. T. Seton

their dung with cat-like scrupulousness, but they leave it at one end of the run. Stevens's pens, though smaller, have escaped all diseases because, he says, each year he digs over the soil to sweeten it. The pens must have shady places and sunny places for the varying weather. It is well also to caution the beginners against giving the Foxes a pile of new earth to dig in. This is sure to cave in and cause trouble.

Fur is prime in November, but should be left until late December, as it continues to get fuller, and the fading process does not set in until the end of winter. The fur is improved by cold weather and by plenty of food in the fall, especially oily foods, such as fish heads, etc., and oil cake might prove effectual. Castration, to make a larger, finer robe, has not been tried.

## Cost of Stock

In getting stock the fox-farmer must remember that the farther north it comes from the better, and that the Gray-fox of Virginia and the South is not wanted at any price. The best way to get Foxes is by digging out the young in May and June.

Wild Red-foxes can often be bought for one or two dollars each. The breeder gets $8 to $15 a pair for good cage-reared seasoned specimens of the common Red-fox. But we wish to raise Silver Foxes, not common Reds. As already stated, the Silver, Black, and Cross-foxes are mere colour freaks of the Red-fox. They are found wild in every shade and inter-grade. The ideal and inimitable Silver Fox is glossy jet-black with a sprinkling of silver on the long hairs, giving a frosted finish of exquisite beauty. A pair of Silver Foxes may produce a litter of Red-fox young. But these things run in families and a pair of Silvers or Blacks are almost sure to produce some of their own colour. By selecting the dark ones for breeding, the desired type can soon be fixed. In five generations, that is, five years, Norton tells me he found it possible to breed out all the Red and have a strain of pure Silver Foxes. From a pair of fairly good Blacks, valued at $50 each as pelts, he last year raised 7 perfect Silvers worth $200 each.

## Profit

There are two sources of profit to the fur-breeder. First, the sale of fur; apparently this is his only one. The Winnipeg *Commercial* gives the following quotations for Fox pelts, March, 1904:

| | | | | | |
|---|---|---|---|---|---|
| Prime Common Red | . . | $ 1.50 | to | $ 4.00 |
| " Cross | . . . . | 5.00 | " | 15.00 |
| " Silvers | . . . . | 50.00 | " | 200.00 |

These may be considered as conservative figures. W. F. Sheard, the fur-dealer at Tacoma, tells me that he once sold three perfectly matched Silver Foxes for $1,200. A man, therefore, with an acre of ground "under Foxes" might raise 20 to 40 Silvers a year with an average market value of $150 each, *i. e.*, $3,000 to $6,000 a year gross, and the expenses would be very low.

How long the price would keep up to this high figure it is impossible to say, but it has kept up for over a hundred years and there is no present sign of decline; rather the contrary.

My own impression is that twenty years from now there will be a great many fur-farmers furnishing first-class Silver Foxes, more than ever before were put on the market. This will eventually lower the prices, but it will be largely offset by the increasing market, and it is safe to say that so beautiful a fur will always fetch a figure sufficient to make it remunerative to produce.

The second profit of the dealer, and perhaps his best, is the sale of his fine stock to other breeders. A Fox whose pelt is valued at $100 is worth $300 as a breeder. Messrs. Norton and Stevens hold their breeders at: Reds, $15 per pair; Cross, $75 per pair; Silvers, $300 to $400 per pair, and even at that figure they tell me that they cannot keep pace with the demand. This would naturally decrease, but to judge from experience in other fine stock it is more permanent than it would seem. It will probably last quite long enough to enable the prudent to gather a very handsome return and perhaps a comfortable fortune.

From this we can see that the Fox-breeding does not differ essentially from the breeding of any other high-class stock. Judgment, economy, cleanliness, and thrift will make it a success. I am satisfied that any man who has made a success of hens can make a success of Foxes, with this advantage for the latter—a Fox requires no more space or care than a hen, but is worth twenty times as much, so gives a chance for returns twenty times as great.

My prophecies of twenty years ago have more than come true. Fur-farming has grown to be a national industry.

For those who wish to go into it, or study it seriously, the following books are recommended:

*Silver Fox Farming*, by F. G. Ashbrook. U. S. Dept. Agri., Bull. No. 1151. Pub. June 20, 1923; 60 pp., many ills.; 15 cents per copy.

*Fur Farming in Canada*, by J. Walter Jones, Comm. of Conservation,

Canada. Ottawa, 1914; 8vo, 278 pp., many ills.; treating all kinds of animals ranched for fur in Canada.

*Fur Seals and Other Life of the Pribilof Islands, Alaska, in* 1914, by W. H. Osgood, E. A. Preble, and G. H. Parker. Bull. Bur. Fisheries, Doc. No. 820. June 19, 1915; 172 pp., many ills. and maps. Blue-fox Ranching, by E. A. Preble, pp. 105–116.

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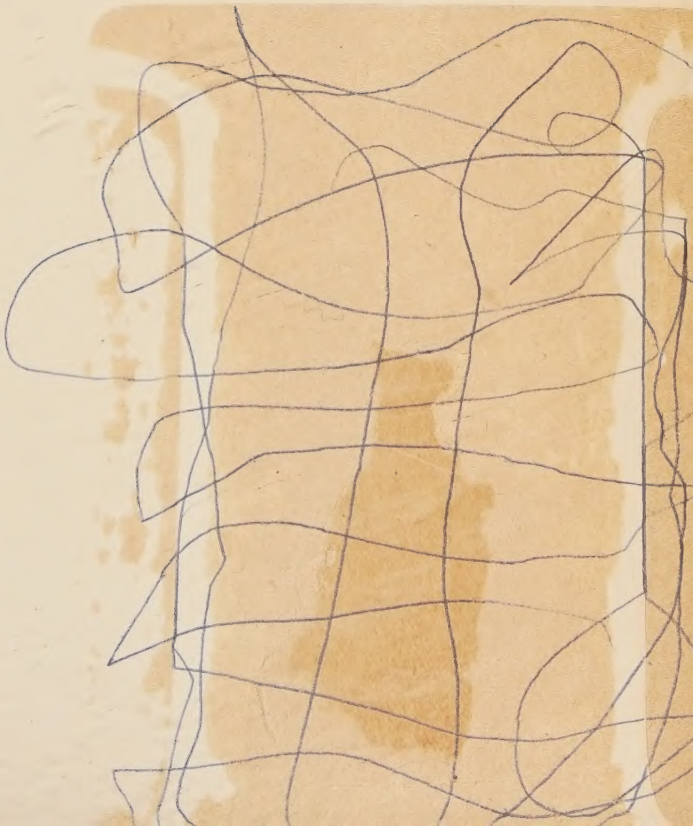
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